

GOVERNMENT OF INDIA

DEPARTMENT OF ARCHAEOLOGY

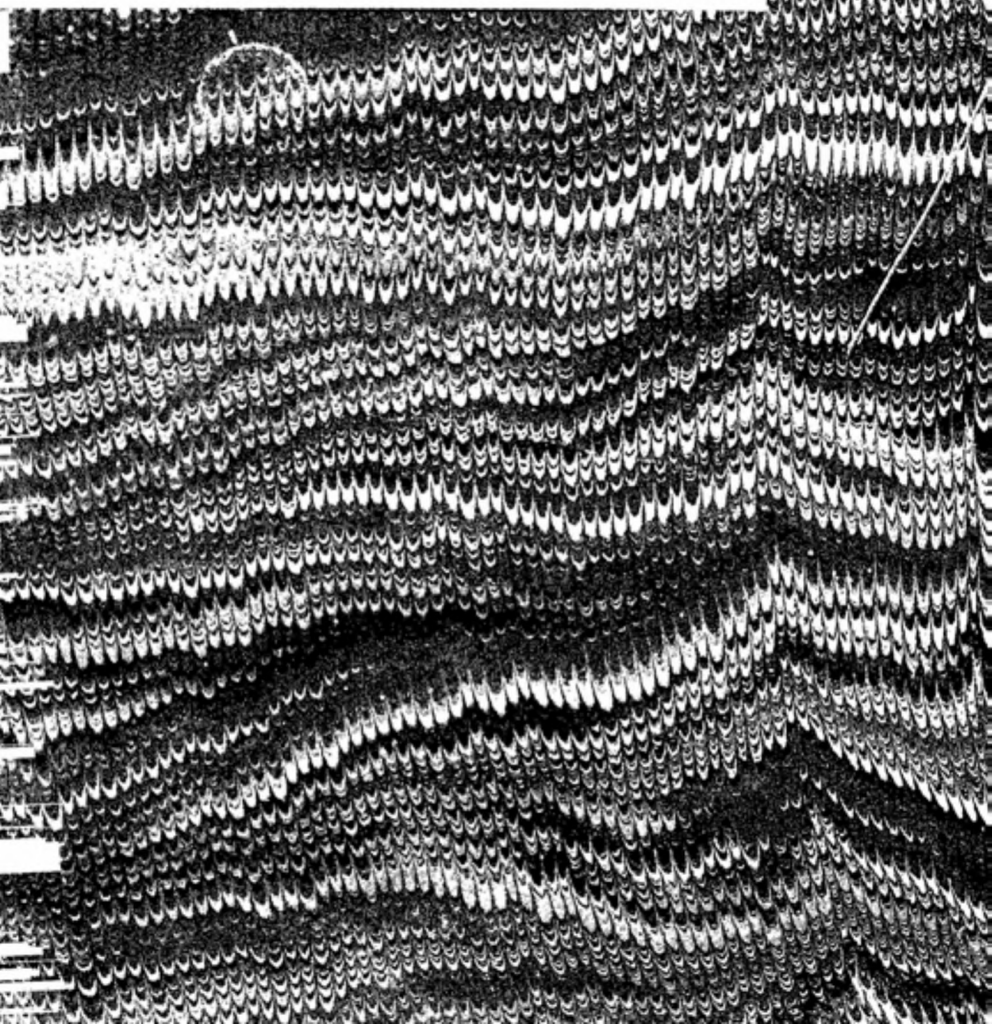
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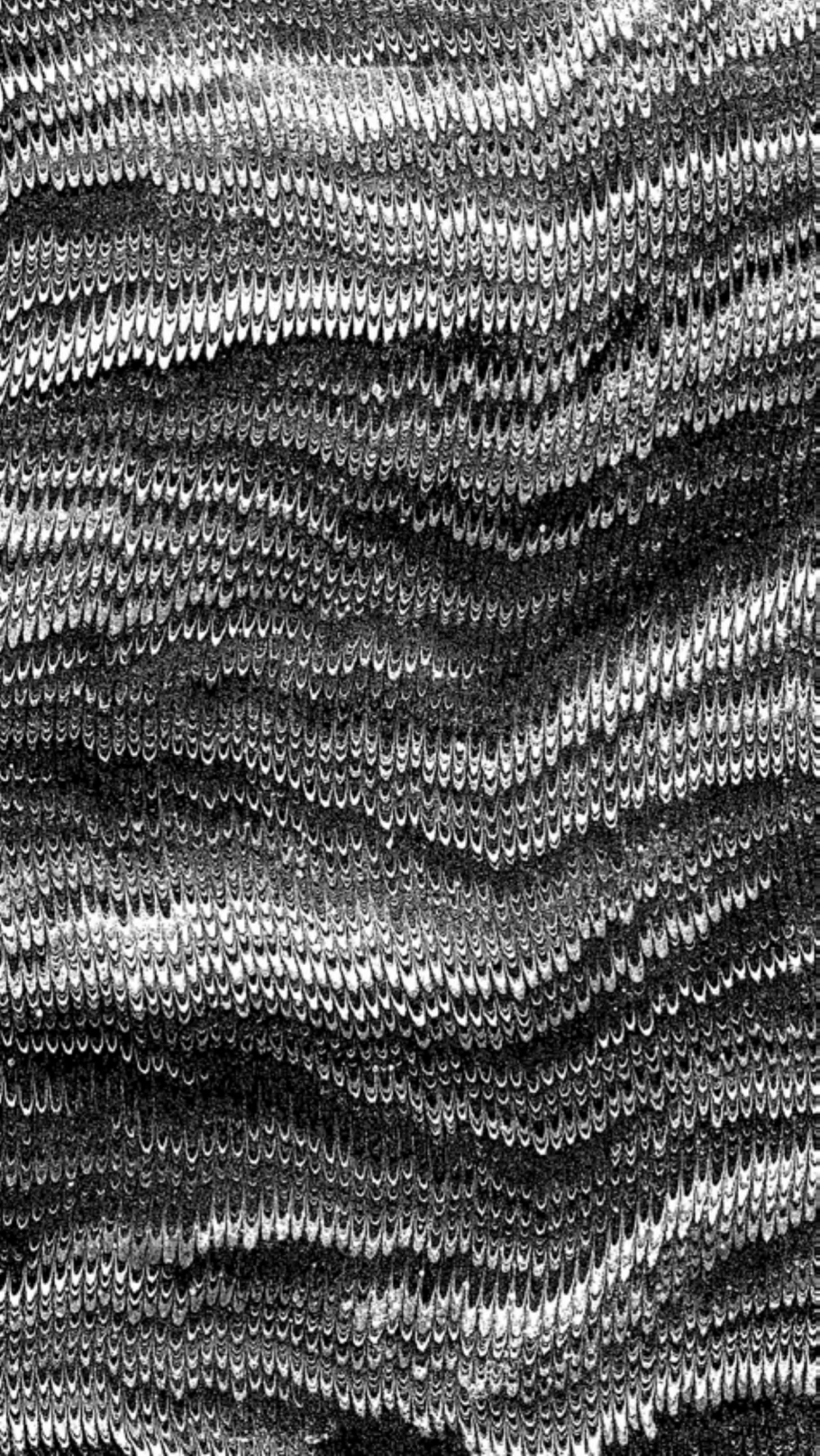
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25012

CALL No. 891.05/P.A.S.B.

D.G.A. 79.







# PROCEEDINGS

OF THE

## ASIATIC SOCIETY OF BENGAL.

EDITED BY

THE HONORARY SECRETARIES.



JANUARY TO DECEMBER,

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P.A.S.S.

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CALCUTTA:

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1872.



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## ERRATA.

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Page 119, line 5 from below, *for* Bimlisára, *read* Bimbisára.

Page 120, line 10, *for* Rohon, *read* Rohoi.

Page 132, line 17, *for* 902, *read* 903.

Page 33, line 19, *for* a ordinary, *read* an ordinary.

Page 131, lines 15, 18 and 30, *for* RHYE, *read* RHYS.

APPENDIX.

LIST OF MEMBERS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
ON THE 31ST DECEMBER, 1871.

# LIST OF ORDINARY MEMBERS.

The \* distinguishes Non-Subscribing, the † Non-Resident Members,  
and the ‡ Life-Members.

N. B.—Gentlemen who may have changed their residence, since this list was drawn up, are requested to give intimation of such a change to the *Secretaries*, in order that the necessary alterations may be made in the subsequent edition. Errors or omissions in the following list should also be communicated to the *Secretaries*.

Gentlemen who are proceeding to Europe, with the intention of not returning to India, are particularly requested to notify to the *Secretaries*, whether it be their desire to continue as members of the Society.

Date of Election.		
1847 June 2.	*Abbot, Major-Gen. J., R. Artillery.	Europe
1871 March 1.	†Abbey Walter, Esq., Civil Surgeon.	Mergui
1860 Dec. 5.	Abdullatif Khán Bahádur, Maulavi.	Calcutta
1868 Sept. 2.	†Adam, R. M., Esq.	Sambhar Lake, viá Jeypur
1869 Jan. 20.	†Adley, C. C., Esq., C. E., Nerbudda Coal & Iron Co.	Gunwarra, Cen- tral India
1860 July 4.	†Ahmad Khan, Sayyid, Bahádur.	Benares
1860 April 4.	†Aitchison, J. E. T., Esq., M. D.	Rawal Pindi.
1859 Feb. 2.	*Alabaster, C., Esq.	China
1871 Oct. 4.	Aldis, J. A., Esq., M. A.	Calcutta
1866 Jan. 17.	Allan, Lieut.-Col. A. S.	Calcutta
1852 July 7.	*Allan, C., Esq., B. C. S.	Europe
1869 Oct. 6.	*Allardyce, A., Esq.	Europe
1871 June 7.	†Alexander, J. W., Esq.	Patna
1860 Oct. 3.	Amír Alí Khán, Bahádur, Munshí.	Calcutta
1870 June 1.	†Amír Hasan Khán Bahádur, Rájá.	Malumudabad, Oudh
1865 Jan. 11.	Anderson, Dr. J., F. L. S.	Calcutta
1843 Sept. 4.	*Anderson, Lieut.-Col. W., B. Artillery.	Europe
1864 Dec. 7.	*Anderson, W., Esq.	Europe
1861 Sept. 4.	*Asghar Alí Khán Bahádur, Nawáb.	Europe
1869 Feb. 3.	*Ashton, Rev. J. P.,	Europe
1861 July 3.	*Asphar, J. J. T. H., Esq.	Europe
1871 Sept. 6.	†Atkinson, E. T., Esq., C. S.	Allahabad
1855 July 4.	Atkinson, W. S., Esq., M. A., F. L. S.	Calcutta
1869 Feb. 3.	†Attar Singh Bahádur, Sirdár.	Loodiana
1871 April 5.	Ayrton, W. E., Esq.	Calcutta
1835 Oct. 7.	*Baker, Col. W. E., Bengal Engineers.	Europe
1859 Aug. 3.	Balaichanda Sínha, Bábu.	Calcutta
1865 Nov. 1.	†Ball, V., Esq., Geol. Survey.	Geol. S. Office
1860 Nov. 7.	Banerjee, Rev. K. M.	Calcutta

Date of Election.		
1869 Dec.	1.	†Barker, R. A., Esq., M. D.
1864 May	4.	*Barry, Dr. J. B.
1856 Sept.	3.	Bashiruddin, Sultan, Muhammad.
1860 July	4.	†Batten, G. H. M., Esq., B. C. S.
1838 Jan.	3.	*Batten, J. H., Esq., B. C. S.
1869 Feb.	3.	†Baxter, J. B., Esq., M. R. C. S.
1859 May	4.	Bayley, E. C., Esq., B. C. S., C. S. I.
1861 Feb.	6.	Bayley, S. C., Esq., B. C. S.
1868 May	6.	*Baynes, J., Esq.
1849 June	6.	*Beadon, The Hon'ble Sir Cecil, B. C. S.
1864 Sept.	7.	†Beames, J., Esq., B. C. S.
1841 April	7.	Beaufort, F. L., Esq., B. C. S.
1847 Aug.	4.	*Beckwith, J., Esq.
1867 July	3.	†Belletty, N. A., Esq.
1869 Jan.	20.	*Bellew, Dr. P. F.
1871 March	1.	Benedict, E., Esq., C. E.
1830 Sept.	1.	*Benson, Lieut.-Col. R.
1862 Oct.	8.	Bernard, C. E., Esq., B. C. S.
1862 June	4.	†Bhau Daji, Dr.
1864 Nov.	2.	Bhudeva Mukerjee, Bábú.
1840 July	15.	*Birch, Major-General Sir R. J. H., K. C. B.
1846 March	4.	*Blaggrave, Major T. C., 26th Regt., B. N. I.
1859 Sept.	7.	*Blane, Col. Sir S. J.
1857 Mar.	4.	Blanford, H. F., Esq., A. R. S. M., F. G. S.
1859 Aug.	3.	†Blanford, W. T., Esq., A. R. S. M., F. G. S., Geol. Survey.
1871 May	3.	†Bligh, C. F., Esq.
1864 April	6.	Blochmann, H., Esq., M. A.
1857 Aug.	2.	*Bogle, Lieut.-Col. Sir. A., Kt.
1871 April	5.	†Bourn, T. W., Esq.
1871 April	5.	†Bourne, Walter, Esq., C. E.
1868 Jan.	15.	*Boxwell, J., Esq., C. S.
1854 Nov.	1.	*Boycott, Dr. T., B. M. S.
1860 March	2.	*Brandis, Dr. D.
1860 Oct.	3.	*Brandreth, The Hon'ble J. E. L.
1871 Oct.	4.	Briggs, J. A., Esq.
1870 Aug.	3.	†Broadley, A. M., Esq., C. S.
1866 April	4.	*Broderick, H. C., Esq., M. D.
1847 June	2.	*Brodie, Capt. T., 5th Regiment, B. N. I.
1871 Jan.	4.	Brough, R. S., Esq.
1866 Jan.	17.	†Brown, Col. D.
1866 Nov.	7.	†Browne, Lieut.-Col. Horace A.
1866 June	6.	†Brownfield, C., Esq.
1868 June	3.	†Buck, E. C., Esq., C. S.
1871 July	5.	†Buckland, C. T., Esq., C. S.
1866 June,	6.	†Buckle, Dr. H. B., C. B.
1871 Sept.	6.	†Buckle, H., Esq.
		Beerbhoom
		Europe
		Chinsurah
		Agra
		Europe
		Sandheads
		Calcutta
		Calcutta
		Europe
		Europe
		Balasore
		Calcutta
		Europe
		Mymensing
		Europe
		Calcutta
		Europe
		Calcutta
		Bombay
		Chinsurah
		Europe
		Europe
		Europe
		Calcutta
		Geol. S. Office
		Toung-hoo, Bur-
		ma.
		Calcutta
		Europe
		Yeotmahal, East
		Berar.
		Madapoor
		Europe
		Europe
		Europe
		Europe
		Calcutta
		Behar
		Europe
		Europe
		Calcutta
		Rangoon
		Thayetmo, Burma
		Kamrup
		Cawnpur
		Burdwan
		Dacca
		Akyab



Date of Election.		
1869 Jan. 20.	†Cadell, A., Esq., B. A., C. S.	Mozaffernagar
1859 Sept. 7.	*Campbell, Dr. A.	Europe
1863 June 3.	Campbell, The Hon'ble G.	Calcutta
1860 Jan. 3.	†Carnac, J. H. Rivett, Esq., B. C. S.	Nagpur
1868 Aug. 5.	†Chandramohana Goswami, Pandita.	Gowhati
1863 Aug. 5.	†Chandranátha Ráya, Rája.	Nator
1871 Sept. 6.	†Chisholm, R. F., Esq.	Madras
1868 Feb. 5.	*Clark, Major E. G., Bengal Staff Corps.	Europe
1871 March 1.	†Clarke, C. B. Esq.	Dacca
1863 April 1.	*Cleghorn, Dr. H.	Europe
1868 Nov. 4.	†Cole, Lieut. H. H., R. E.	India
1862 April 2.	*Colles, J. A. P., Esq., M. D.	Europe
1851 March 5.	*Colvin, J. H. B., Esq., B. C. S.	Europe
1871 Oct. 4.	†Cooke, H. G., Esq., C. S.	Chittagong
1868 Dec. 2.	†Cooke, J. E., Esq.	Haidarabad
1860 Dec. 5.	*Cooper, F. H., Esq., B. C. S.	Europe
1870 June 1.	Couch, The Hon'ble Sir R.	Calcutta
1857 March 4.	*Cowell, E. B., Esq., M. A.	Europe
1866 May 2.	*Cox, W. H., Esq.	Europe
1861 July 3.	*Crockett, Oliver R., Esq.	China
1871 April 5.	Curtoys, W. J., Esq.	Calcutta
1868 Sept. 2.	Cutsem, E. Ch. Van, Esq.	Calcutta
1862 April 2.	*Dalrymple, F. A. E., Esq., C. S.	Europe
1847 June 2.	†Dalton, Col. E. T., C. S. I., Staff Corps.	Chota Nagpur
1870 May 4.	†Damant, G. H., Esq., C. S.	Dinajepore
1871 Jan. 4.	†Daukes, F. C., Esq., C. S.	Allahabad
1861 March 6.	Davey, N. T., Esq., Revenue Survey.	Howrah
1861 Nov. 6.	†Davies, The Hon'ble R. H., C. S. I., B. C. S.	Panjab
1869 April 7.	†Day, Dr. F., F. L. S., F. Z. S.	India
1856 June 4.	†DeBourbel, Major R., Bengal Engrs.	Oudh
1870 Feb. 2.	†DeFabeck, F. W. A., Esq., Bengal Medical Service.	Jeypore
1869 Oct. 6.	†Delmerick, J. G., Esq.	Rawal Pindi
1861 June 5.	*Denison, His Excellency Sir W., K. C. B.	Europe
1864 July 6.	Devendra Mallika, Babu.	Calcutta
1861 March 6.	*Devereux, The Hon'ble H. B., B. C. S.	Europe
1862 May 7.	†Dhanapati Singha Dughar, Ráya Bahádur.	Azimganj
1853 Sept. 7.	Dickens, Lieut.-Col. C. H.	Calcutta
1871 March 1.	Dijendranatha Thakura, Babu.	Calcutta
1870 May 4.	Dobson, G. E., Esq., M. B.	Calcutta
1859 Sept. 7.	†Douglas, Col. C.	Meerut
1869 Feb. 3.	†Drew, F., Esq.	Jummoo, via Sealkoto
1870 March 8.	†Duke of Edinburgh, His Royal Highness.	Europe
1864 Dec. 7.	*Dunlop, H. G., Esq.	Europe
1867 June 5.	*Duthoit, W., Esq., C. S.	Europe
1861 May 1.	*Earle, Capt. E. L., Bengal Artillery.	Europe
1857 May 6.	*Eatwell, Dr. W. C. B.	Europe

Date of Election.			
1868 Oct.	7.	†Eddowes, W., Esq., M. D.	Erinpur
1863 May	6.	†Edgar, J. W. Esq., B. C. S.	Cachar
1840 Oct.	7.	*Edgeworth, M. P., Esq., B. C. S.	Europe
1865 Feb.	1.	*Egerton, Ph., Esq., B. C. S.	Europe
1846 Jan.	7.	*Elliot, Sir Walter, late M. C. S.	Europe
1859 Nov.	2.	†Elliot, C. A., Esq., B. C. S.	Allahabad
1856 March	5.	*Ellis, Lieut.-Col. R. R. W., 23rd Regt., B. N. I.	Europe
1854 Nov.	1.	*Elphinstone, Capt. M. W., 30th Regt., B. N. I.	Europe
1861 Jan.	9.	*Ersine, The Hon'ble C. J., Bombay C. S.	Europe
1856 Aug.	6.	*Ersine, Major W. C. B.	Europe
1871 Oct.	4.	†Evezard Col. G. E.	Poona
1863 Oct.	7.	Ewart, J., Esq., M. D.	Calcutta
1862 Aug.	6.	*Eyre, Col. Vincent, C. B.	Europe
•			
1871 Feb.	1.	Farr, G. C. Esq.	Calcutta
1851 May	7.	Fayrer, Dr. J., C. S. I.	Calcutta
1863 Jan.	15.	†Fedden, Francis, Esq., Geol. Survey.	Geol. S. Office
1869 April	7.	†Ferrar, M. L., Esq., B. A., C. S.	Sitapur, Oudh
1868 May	6.	†Field, C. D., Esq., M. A., C. S.	Chittagong
1869 Sept.	1.	†Fisher, J. H., Esq., C. S.	Allahabad
1860 Mar.	7.	*Fitzwilliam, The Hon'ble W. S.	Europe
1867 April	3.	†Ford, Lieut.-Col. B.	Madras
1861 Feb.	6.	†Forest, R., Esq., Civil Engineer.	Dehra
1869 Oct.	12.	†Forlong, Lieut.-Col. J. G. R., Madras Staff Corps.	Ahú, Rajputana
1863 June	3.	†Forsyth, T. D., Esq., C. B.	Umballa
1871 Nov.	1.	†Foster, J. M., Esq., M. R. C. P.	Nazeerah, Assam.
1868 April	1.	*Frédéric of Schleswig-Holstein, H. R. H. Prince.	Europe
1860 March	7.	*Frere, Sir H. Bartle, K. C. B., B. C. S.	Europe [goon
1869 Sept.	1.	†Fryer, Capt. G. E., Dy. Commissioner.	B. Burma, Ran-
1859 Dec.	7.	Futteh Ali, Maulavi.	Calcutta
1867 Sept.	4.	*Fyfe, The Rev. W. C.	Europe
1849 Sept.	5.	*Fytche, Major Genl. A., C. S. I., Chief Commissioner of Burma.	Europe
•			
1871 June	7.	Gangaprasad Sinha, Babu.	Calcutta
1871 Aug.	2.	†Gangaprasad, Munshi.	Moradabad
1859 Aug.	3.	*Gastrell, Col. J. E., Supdt., Rev. Survey.	Europe
1862 Feb.	5.	†Gauradása Basáka, Babu.	Burdwan
1867 Sept.	4.	†Gauvain, Capt. V.	India
1867 Dec.	4.	Gay, E., Esq., M. A.	Calcutta
1868 Nov.	4.	*Geddes, J. C., Esq., C. S.	Europe
1859 Sept.	7.	Geogheghan, J., Esq., B. C. S.	Calcutta
1869 Feb.	3.	†Giriprasáda Singha, Thákur.	Allighur
1842 Sept.	2.	*Gladstone, W., Esq.	Europe

Date of Election.			
1861 Feb.	6.	*Godwin-Austen, Major H. H., Topographical Survey.	Europe
1869 Oct.	6.	†Gomes, A. D. B., Esq.	Sunderbuns
1859 Sept.	7.	*Goodeve, E., Esq., M. D.	Europe
1862 July,	2.	†Gordon, J. D., Esq., C. S. I., C. S.	Mysore
1869 July,	7.	†Gordon, Robert, Esq. C. E.	Henzaday, Burma.
1871 March	1.	†Gough, A. E., Esq.	Benares
1871 March	1.	†Govindacoomar Chaudhuri.	Mymensing
1863 Nov.	4.	†Gowan, Lieut.-Col. J. G.	Allahabad
1871 April	5.	†Graham, Major J. M.	Dhurrung
1859 Dec.	7.	*Grant, Sir J. P., K. C. B.	Europe
1860 Jan.	4.	*Grant, T. R., Esq.	Europe
1869 Oct.	6.	*Gray, R., Esq., M. B.	Europe
1867 June	5.	*Gregory, Capt. J., Depy. Commr.	Europe
1866 June	6.	†Gribble, T. W., Esq., B. C. S.	Sarun
1861 Sept.	4.	†Griffin, L. H., Esq., B. C. S.	Lahore
1860 Nov.	7.	†Griffith, R. T. H., Esq., M. A.	Benares
1861 Feb.	6.	†Growse, F. S., Esq., M. A., B. C. S.	Muttra
1871 Jan.	4.	Gunendranatha Thakura, Babu.	Calcutta
1864 Dec.	5.	†Gurucharana Dása, Bábu,	Jamu Kandi
1862 Feb.	5.	*Guthrie, Col. C. S., Bengal Engrs.	Europe
1871 June	7.	Habiburrahmán, Maulavi.	Calcutta
1867 July	3.	†Hacket, C. A., Esq., Geol Survey.	Geol. S. Office.
1869 April	7.	†Hæberlin, The Rev. C.	Ranchec, Chota Nagpur
1847 June	2.	*Hall, F. E., Esq., M. A., D. C. L.	Europe
1866 Jan.	17.	*Hamilton, Major T. C.	Europe
1863 June	3.	*Hamilton, Col. G. W.	Europe
1855 March	7.	†Hamilton, R., Esq.	Wurdah
1871 July	5.	Hamilton, Col. O.	Calcutta
1847 May	5.	*Hannington, Col. J. C., 63rd Regt., N. I.	Europe
1861 March	1.	†Harachandra Chaudhari, Babu.	Mymensing
1859 Oct.	12.	*Hardie, Dr. G. K.	Europe
1866 Nov.	1.	Harendra Krishna Bahádur, Kumár.	Calcutta
1862 Oct.	8.	*Harington, The Hon'ble H. B.	Europe
1871 Feb.	1.	*Harkness, T. F., Esq., C. S.	Europe
1861 Feb.	6.	†Harrison, A. S., Esq., B. A.	Bareilly
1859 Oct.	12.	†Haughton, Lieut.-Col. J. C., C. S. I.	Kooch Behar
1862 Aug.	6.	Heeley, W. L. Esq., B. A., C. S.	Calcutta
1866 April	4.	*Henry, N. A., Esq.	Europe
1853 July	6.	†Herschel, W. J., Sir, Bart., B. C. S.	Krishnagur
1854 March	1.	*Hichens, Lieut. W., Bengal Engrs.	Europe
1868 Aug.	5.	†Hobart, R. T., Esq., C. S.	Etah
1868 Nov.	4.	*Holroyd, Capt. W. R. M.	Europe
1863 July	1.	*Horne, C., Esq., C. S.	Europe
1863 Jan.	15.	*Howell, M. S., Esq., C. S.	Europe
1871 April,	5.	Howell, A. P., Esq., C. S.	Calcutta

Date of Election.		
1866 Feb.	7.	Hoyle, G. W., Esq.
1867 Aug.	7.	*Hughes, T. H., Esq., A. R. S. M., F. G. S., Geol. Survey.
1866 Jan.	17.	†Hughes, Captain W. G.
1870 Jan.	5.	Hume, Allan O., Esq., C. B., C. S.
1870 June	1.	*Hunter, W. W., Esq., LL. D., C. S.
1867 May,	1.	*Hyatt, Dr. B. N., Civil Surgeon.
1868 April,	1.	*Hyde, Lieut.-Col. H., R. E.
1869 Sept.	1.	*Hyde, E., Esq.
1860 Jan.	4.	Innes, Lieut.-Col. J. J. McLeod, R. E.
1870 April	6.	*Innes, F. W. Esq., M. D., C. B.
1866 March	7.	†Irvine, W., Esq., C. S.
1862 Oct.	8.	*Irwin, Valentine, Esq., C. S.
1871 March	1.	Isaac, T. S., Esq., C. E.
1853 Dec.	7.	†Isvariprasáda Singha Bahádur, Rája.
1864 Sept.	7.	Jackson, The Hon'ble E.
1841 March	5.	*Jackson, W. B., Esq., B. C. S.
1861 Dec.	4.	*James, Major H. R., C. B.
1865 June	7.	†Jayakissen Dása Bahádur, Rája, C. S. I.
1845 Dec.	3.	*Jerdon, Dr. T. C.
1866 Feb.	7.	†Johnson, W. H., Esq.
1847 June	2.	*Johnstone, J., Esq.
1862 March	5.	†Johnstone, Capt. J. W. H., Assistant Commissioner.
1867 Dec.	4.	*Johnstone, Capt. J.
1859 Sept.	7.	*Jones, R., Esq.
1869 April	7.	Kabiruddín Ahmad, Maulavi.
1871 May	3.	Kaliprasanna Ghosha Babu.
1863 July	1.	*Kane, H. S., Esq., M. D.
1850 April	3.	*Kay, Rev. W., D. D.
1861 Dec.	4.	†Kempson, M., Esq., M. A.
1867 Dec.	4.	King, G. Esq., M. B.
1867 March	6.	†King, Capt. H. W.
1862 Jan.	15.	†King, W., Jr., Esq., Geol. Survey.
1867 March	6.	†Knox, G. E., Esq., C. S.
1869 May	5.	Kurz, S., Esq.
1839 March	6.	*Laidlay, J. W., Esq.
1861 March	6.	*Laing, The Hon'ble S.
1869 Sept.	1.	*Latham, G., Esq., C. E.
1852 April	7.	*Lees, Lieut.-Col. W. N., LL. D.
1868 Feb.	5.	*Lees, L. H., Esq., M. D.
1868 July	1.	†Leitner, Dr. G. W.,
1859 Dec.	7.	Leonard, H. Esq., M. A.
1870 July	6.	Lethbridge, E., Esq., M. A.
1869 June	2.	†Leupolt, J. C., Esq., C. S.
1865 June	7.	*Lewin, Capt. T. H.
		Calcutta
		Europe
		Akyab
		Calcutta
		Europe
		Europe
		Europe
		Calcutta
		Benares
		Calcutta
		Europe
		Europe
		Gorniepur
		Europe
		Calcutta
		Benares
		Calcutta
		Europe
		Europe
		Europe
		Allighur
		Europe
		Sialkote
		Europe
		Bunnoo, Panjab
		Europe
		Europe
		Calcutta
		Calcutta
		Europe
		Europe
		Europe
		Barcilly [Garden
		Calcutta, Botanic
		P. & O. Co.'s Office
		Madras
		Allahabad
		Calcutta Botanic
		Garden
		Europe
		Europe
		Europe
		Europe
		Europe
		Lahore
		Calcutta
		Hooghly
		Etah
		Europe

Date of Election.		
1856 Feb.	6.	*Liebig, Dr. G., von.
1860 Jan.	4.	*Lindsay, E. J., Esq.
1862 Dec.	3.	†Lobb, S., Esq., M. A.
1864 Nov.	2.	Locke, H. H., Esq.
1869 April	7.	*Lockwood, E. D., Esq., C. S.
1866 May	2.	*Lovett, Lieutenant B.
1866 Jan.	17.	†Low J. Esq., G. T. S.
1854 Nov.	1.	*Lushington, F. A., Esq., B. C. S.
1869 July	7.	†Lyall, C. J., Esq., B. A., C. S.
1870 April	6.	†Lyman, B. Smith, Esq.
1863 Dec.	2.	†Macauliff, M., Esq., B. A., C. S.
1866 June	6.	Macdonald, Major J., Staff Corps.
1848 April	5.	*MacLagan, Col. R., R. E., F.R.S.E., F.R.G.S.
1867 July	3.	Macnamara, Dr. C.
1871 April	5.	Macnamara, Dr. F. N.
1870 May	4.	†Macnaghten, C., Esq.
1853 April	6.	*Macrae, Dr. A. C.
1867 April	3.	Mahendralála Saracára, Dr.
1863 Jan.	15.	*Maine, Sir H. S.
1867 April	3.	†Mainwaring, Lieut.- Col. G. B.
1860 Jan.	4.	*Mair, D. K., Esq., M. A.
1862 Sept.	3.	†Mallet, F. R., Esq., Geol. Survey.
1852 Nov.	3.	Manickjee Rustamjee, Esq.
1867 March	6.	Markby, The Hon'ble W.
1869 July	7.	†Markham, A. M., Esq., C. S.
1850 Jan.	2.	*Marshman, J. C., Esq.
1863 Nov.	4.	*McClelland, Dr. J.
1837 Oct.	4.	*McLeod, Sir D. F., C. B., K. C. S. I., B. C. S.
1860 March	7.	†Medlicott, H. B., Esq., F. G. S., Geol. Survey.
1855 Nov.	7.	*Middleton, J., Esq.
1861 Feb.	6.	*Melville, Capt. A. B., Staff Corps.
1871 Sept.	6.	†Miles, Capt. S. B.
1850 April	3.	*Miles, A. J. M., Esq., B. C. S.
1870 July	6.	Miller, A. B., Esq.
1867 June	5.	Milman, R., D. D., The Right Rev. Lord Bishop of Calcutta.
1847 April	7.	*Money, D. J., Esq., B. C. S.
1856 Feb.	6.	†Money, W. J., Esq., C. S. I., B. C. S.
1867 March	6.	†Montgomerie, Major T. G., R. E.
1854 Dec.	6.	*Morris, G. G., Esq., B. C. S.
1871 July	5.	†Muhammad Hasan Khalifah, Sayyid.
1837 July	5.	*Muir, J., Esq.
1854 Oct.	11.	†Muir, Sir W., K. C. S. I., B. C. S.
1862 July	2.	†Napier of Magdala, Lord R., General, G. C. S. I., G. C. B.

Europe

Europe

Krishnagur

Calcutta

Europe

Ispahan

Almora

Europe

Allahabad

America

Hoshiarpore

Calcutta

Europe

Calcutta

Calcutta

Rajkote College,

Kattywar

Europe

Calcutta

Europe

Darjeeling

Europe

Geol. S. Office

Calcutta

Calcutta

Bijnour

Europe

Europe

Europe

Europe

Geol. S. Office

Europe

Europe

Bombay

Europe

Calcutta

Calcutta

Europe

Nuddlea

Dera Doon

Europe

Patialah

Europe

Allahabad

India.

Date of Election.			
1871 Oct.	4.	†Neil, Dr. A. .	Lahore
1869 May	5.	Nevill, G., Esq., C. M. Z. S.	Calcutta
1865 Feb.	1.	†Newal Kishwar Munshi.	Lucknow
1869 May	5.	†Newall, Lieut.-Col. D. J. F., R. A.	Gwalior
1870 Feb.	5.	†Newman, J. H., Esq., M. D.	Jodhpur, Rajpu- tana
1871 Jan.	4.	†Newton, Isaac, Esq.	Umballa
1852 Sept.	1.	*Nicholls, Capt. W. T., 24th Regiment, M. N. I.	Europe
1869 July	7.	†Nursing Rao, A. V., Esq.	Vizagapatam
1871 July	5.	†Oates, E. W., Esq., C. E.	Prome, B. Burma
1871 Oct.	4.	*O'Kinealy, J., Esq., C. S.	Europe
1851 June	4.	Oldham, T., Esq., LL. D., F. R. S., Super- intendent, Geol. Survey.	Calcutta
1869 April	5.	†Oldham, W., Esq., LL. D., C. S.	Ghazipur
1867 Aug.	7.	†Oldham, R. A., Esq., C. E.	Dehree.
1837 June	7.	*O'Shaughnessy, Sir W. R.	Europe
1847 Feb.	10.	*Ousely, Major W. R.	Europe
1864 Mar.	2.	*Palmer, Dr. W. J.	Europe
1862 May	7.	*Partridge, S. B., Esq., M. D.	Europe
1867 Feb.	6.	*Paul, J. Esq.	Europe
1871 Dec.	6.	†Peal, S. E., Esq.	Sibsagar, Assam
1867 Mar.	6.	Pearimohana Mukarji, M. A., Bábu.	Uttarparah
1860 Feb.	1.	†Pearson, Major G. G.	Bangalore
1868 Nov.	4.	†Pearson, C. E.	Rawul Pindi
1869 July	7.	Pell, S., Esq.	Calcutta
1864 Mar.	2.	Pellew, F. H., Esq., C. S.	Hooghly
1865 Sept.	6.	†Peppé, J. H., Esq.	Gya
1868 May	6.	Peterson, F. W., Esq.	Calcutta
1867 Nov.	6.	*Petit, Mons. Eugène.	Europe
1835 July	1.	*Phayre, Major G., Sir A. P., K. C. S. I., C. B.	Europe
1864 Nov.	2.	Phear, The Hon'ble J. B.	Calcutta
1869 Feb.	3.	†Pickford, J., Esq., M. A.	Madras
1867 Sept.	4.	*Place, Mons. V., Consul-Gen., France.	Europe
1870 Feb.	2.	†Powell Baden, H., Esq., C. S.	Lahore
1868 April	1.	†Pramathanátha Ráya, Kumár.	Digapati
1869 Feb.	3.	Pratápachandra Ghosha, B. A.	Calcutta
1871 June	7.	†Pratt, Capt. C. S., Staff-Corps.	Morar, Gwalior
1825 Mar.	9.	*Prinsep, C. R., Esq.	Europe
1862 Oct.	8.	†Pulínavihári Sen, Bábu.	Berhampur
1856 Mar.	5.	Rájendralála Mitra, Bábu.	Calcutta
1868 Jan.	15.	†Rákhaldass Haldar, Bábu.	Chota Nagpur
1871 June	7.	Rámakrishna Dása, Bábu.	Calcutta
1837 Feb.	1.	Ramánátha Thákura, Bábu.	Calcutta
1866 Jan.	17.	*Rattray, A., Esq. Asst. Commr.	Europe
1860 Mar.	7.	†Reid, H. S., Esq., C. S.	Allahabad



Date of Election.		
1871 July	5.	†Reid, J. R., Esq., C. S.
1857 June	7.	*Riddell, The Hon'ble H. B., B. C. S.
1868 April	1.	Robb, G., Esq.
1868 July	1.	*Roberts, Rev. J.
1863 April	1.	†Robertson, C., Esq., C. S.
1865 Feb.	1.	Robinson, S. H., Esq.
1847 Dec.	1.	*Rogers, Capt. T. E.
1870 Dec.	7.	Rogers, A., Esq.
1871 May	3.	†Rogers, Capt. B.
1869 July	7.	*Ross, Lieut. J. C., R. E.
1870 Jan.	5.	†Ross, Alexander G., Capt. Staff Corps.
1871 April	5.	Rundall, Col. F. H.
		Azimghur Europe Calcutta Europe Mirzapur Calcutta Europe Calcutta Port Blair Europe Simla Calcutta
		[Lino Pachumba, Chord
1871 Dec.	6.	†Samuells, Capt. W. L.
1871 May	3.	Sanderson, C., Esq.
1870 May	4.	Satyánand Ghoshála, Rája.
1861 Dec.	4.	†Saunders, C. B., Esq., C. B., B. C. S.
1864 June	1.	*Saunders, J. O'B., Esq.
1854 Dec.	6.	†Saxton, Col. G. H., F. G. S., Madras Staff Corps.
		Ootacamund Europe Kurachee Calcutta Europe Europe Waltair, near Vizagapatam
1854 May	2.	*Schiller, F., Esq.
1870 May	4.	†Schlich, Dr. W.
1869 Feb.	3.	Schwendler, L., Esq.
1860 Feb.	1.	*Scott, Col. E. W. S.
1869 Aug.	4.	*Selbach, W., Esq.
1860 July	4.	†Shelverton, G., Esq.
		Europe Calcutta Umballa Delhi Rangoon. Raepur, Central Province
1845 Jan.	14.	*Sherwill, Lieut.-Col. W. S., 66th Regiment, B. N. I., F. G. S., F. R. G. S.
1868 Oct.	7.	Shircore, Dr. S. M.
1863 April	1.	†Showers, Lieut.-Col. C. L.
1866 June	6.	†Sime, J., Esq., B. A.
1864 Sept.	7.	†Sladen, Major E. B.
1866 June	6.	†Smart, R. B., Esq., Rev. Survey.
		Howrah Berhampur Europe Ghazipur Allahabad. Bhamo DeraGhazi Khan. Europe Serajgunje Europe Calcutta Akyab Europe Calcutta
1865 July,	5.	Smith, D. Boyes, Esq., M. D.
1868 April	1.	†Smith, McLaren W., Esq.
1856 Feb.	6.	*Smith, Col. J. F.
1871 July	5.	†Smith, J., Esq., C. S.
1854 Sept.	6.	*Spankie, The Hon'ble R., B. C. S.
1864 Mar.	2.	†Spearman, Capt. H. R.
1867 May	1.	†Steel, Lieut. E. H., R. A.
1867 Dec.	4.	*Stephen, Major J. G., Sth N. I.
1863 Sept.	2.	†Stewart, R. D., Esq.
1864 April	6.	*Stewart, J. L., Esq., M. D.
1870 April	6.	Stewart, R., Esq.
1870 Sept.	7.	†St. John, R. T., Esq.
1861 Sept.	4.	*Stokes, Whitley, Esq.
1863 Nov.	4.	Stoliczka, F., Esq., Ph. D., F. G. S., Geol. Survey.

Date of Election.			
1843 May	3.	*Strachey, Major General, R. F. R. S., F. L. S., F. G. S., C. S. I., C. B.	Europe
1869 Feb.	3.	Strachey, The Hon'ble J.	Calcutta
1859 Mar.	2.	†Stubbs, Major F. W., Bengal Artillery.	Lucknow
1858 July	7.	†Sutherland, H. C., Esq., B. C. S.	Sylhet
1864 Aug.	11.	Swinhoe, W., Esq.	Calcutta
1863 Sept.	3.	Syámácharana Saracára, Bábú.	Calcutta
1865 Sept.	6.	Tawney, C. H., Esq., M. A.	Calcutta
1865 April	5.	†Taylor, R., Esq.	Lahore
1860 May	2.	Temple, The Hon'ble Sir R., K. C. S. I., B. C. S.	Calcutta
1871 Feb.	1.	Tennant, Lieut.-Col. J. F., R. E., F. R. S.	Calcutta
1859 Mar.	2.	†Theobald, W., Esq., Geological Survey.	B. Burma
1869 Oct.	6.	†Thomson, A., Esq.	Faizabad
1860 June	6.	*Thompson, J. G., Esq.	Europe
1863 Mar.	4.	*Thompson, Major G. H., Bengal Staff Corps.	Europe
1863 June	4.	*Thornton, T. H., Esq., D. C. L., C. S.	Europe
1847 June	2.	Thuillier, Col. H. L., Royal Artillery, F. R. S., C. S. I.	Calcutta
1862 July	2.	*ThurLOW, The Hon'ble T. J. H.	Europe
1865 July	5.	†Tolbort, T. W. H., Esq., C. S.	Montgomery, Panjab
1865 July	5.	Tonnerre, Dr. C. F.	Calcutta
1862 Feb.	5.	*Torrens, Col. H. D.	Europe
1871 April	5.	Treftz, Oscar, Esq.	Calcutta
1861 June	5.	*Tremlett, J. D., Esq., M. A., C. S.	Europe
1863 Mar.	4.	*Trevelyan, The Right Hon'ble Sir C., K. C. B.	Europe
1841 Feb.	3.	*Trevor, The Hon'ble C. B., B. C. S.	Europe
1861 Sept.	4.	Tween, A., Esq., Geological Survey.	Calcutta
1863 May	6.	†Tyler, Dr. J.	Mynpuri
1869 June	2.	†Udayachánda Datta, Bábú.	Nowakhali
1860 May	2.	†Vanrenen, Major A. D., Bengal Staff Corps.	Moradabad
1864 Feb.	3.	Verchère, A. M., Esq., M. D.	Barrackpore
1864 April	6.	†Vijayaráma Gajapati Ráj Munniá Sultán Bahádur, Máharájah Mirza.	Vizianagram
1870 June	1.	†Vrindávanachandra Maṇḍala, Bábú.	Balasore
1871 Feb.	1.	†Waagen, Dr. W.	Geol. Survey
1869 Augt.	4.	Wáhid Alí, Prince Jahán Qadr Muhammad, Bahádur.	Garden Reach
1865 Nov.	1.	Waldie, D., Esq., F. C. S.	Calcutta
1861 May	1.	*Walker, Col., J. T., Royal Engrs., Bombay.	Europe
1863 May	6.	*Wall, P. W. Esq., Esq., C. S.	Europe
1863 Oct.	7.	Waller, W. K., Esq., M. B.	Calcutta
1862 Jan.	15.	†Ward, G. E., Esq., B. C. S.	Furruckabad
1852 July	7.	*Ward, J. J., Esq., B. C. S.	Europe
1859 July	6.	*Warrand, R. H. M., Esq., B. C. S.	Europe
1865 May	3.	Waterhouse, Capt. J., R. A.	Calcutta

Date of Election.			
1854 July	5.	*Watson, J., Esq., B. C. S.	Europe
1847 Nov.	3.	*Waugh, Major-General Sir A. S., C. B., F. R. S., F. R. G. S.	Europe
1869 Sept.	1.	Westland, J., Esq., C. S.	Calcutta
1867 Feb.	6.	†Westmacott, E. V., Esq., B. A., C. S.	Dinajpur
1862 Oct.	8.	†Wheeler, J. T., Esq.	British Burma
1867 Aug.	7.	†Wilcox, F., Esq., Bengal Police.	Purulia
1867 Jan.	16.	*Williamson, Lieut. W. J.	Europe
1867 Mar.	6.	†Willson, W. G., Esq., B. A.	Krishnagur
1871 Mar.	1.	Willson, James, Esq.	Geol. Survey
1870 Aug.	3.	Wilson, R. H., Esq., C. S.	Calcutta
1859 Aug.	3.	*Wilmot, C. W., Esq.	Europe
1866 Mar.	7.	†Wise, Dr. J. F. N.	Dacca
1867 July	3.	†Wood, Dr. J. J.,	Ranchi
1870 Jan.	5.	Wood-Mason, J., Esq., F. G. S.	Calcutta
1851 May	7.	Woodrow, H., Esq., M. A.	Calcutta
1859 Mar.	2.	*Wortley, Major A. H. P.	Europe
1862 Aug.	6.	*Wylie, J. W., Esq., Bombay C. S.	Europe
1869 Sept.	1.	Yadulála Mallika, Bábu.	Calcutta
1868 June	3.	Yatindramohana Thákura, Rajah Bábhádúr.	Calcutta
1867 Mar.	6.	Yogendranátha Mallika, Bábu.	Andul
1858 April	4.	*Young, Lieut.-Col. C. B.	Europe
1856 July	2.	*Yule, Col. H., R. E.	Europe
1871 Mar.	1.	†Ziauddin Ahmad Khán Bahádur, Nawáb.	Delhi

## LIST OF HONORARY MEMBERS.

Date of Election.			
1825 Mar.	9.	M. Garcin de Tassy, Membre de l'Inst.	Paris
1826 "	1.	Sir John Phillippart.	London
1829 July	1.	Count de Noe.	Paris
1831 "	7.	Prof. C. Lassen.	Bonn
1834 Nov.	5.	Col. W. H. Sykes, F. R. S.	London
1835 May	6.	Prof. Lea.	Philadelphia
1842 Feb.	4.	Dr. Ewald.	Göttingen
1842 "	4.	Right Hon'ble Sir Edward Ryan, Kt.	London
1843 Mar.	30.	Prof. Jules Mohl, Memb. de l'Institute.	Paris
1847 May	5.	His Highness Hekekyan Bey.	Egypt
1847 Sept.	1.	Col. W. Munro.	London
1847 Nov.	3.	His Highness the Nawab Nazim of Bengal.	Murshidabad
1848 Feb.	2.	Dr. J. D. Hooker, R. N., F. R. S.	Kew
1848 Mar.	8.	Prof. Henry.	Princeton, U. S.
1853 April	6.	Major-Gen. Sir H. C. Rawlinson, K. C. B., F. R. S., D. C. L.	London

Date of Election.		
1858 July	6.	B. H. Hodgson, Esq.
1859 Mar.	2.	The Hon'ble Sir J. W. Colville, Kt.
1860 Mar.	7.	Prof. Max Müller.
1860 Nov.	7.	Mons. Stanislas Julien.
1860 "	7.	Dr. Robert Wight.
1860 "	7.	Edward Thomas, Esq.
1860 "	7.	Dr. Aloys Sprenger.
1860 "	7.	Dr. Albrecht Weber.
1865 Sept.	6.	Edward Blyth, Esq.
1868 Feb.	5.	Genl. A. Cunningham, C. S. I.
1868 "	5.	Prof. Bāpu Déva Sātri.
1868 "	5.	Dr. T. Thomson, F. R. S., F. L. S., F. G. S.
1868 Sept.	2.	A. Grote, Esq., C. S.
1871 June	7.	C. Darwin, Esq.
		Europe
		Europe
		Oxford
		Paris
		London
		London
		Bern
		Berlin
		Europe
		India
		Benares
		London
		London
		London

### LIST OF CORRESPONDING MEMBERS.

Date of Election.		
1844 Oct.	2.	Macgowan, Dr. J.
1856 June	4.	Kremer, Herr A. von.
1856 "	4.	Porter, Rev. J.
1856 "	4.	Schlagintweit, Herr H. von
1856 "	4.	Smith, Dr. E.
1856 "	4.	Tailor, J., Esq.
1856 "	4.	Wilson, Dr.
1857 Mar.	4.	Neitner, J., Esq.
1858 Mar.	3.	Schlagintweit, Herr R. von
1859 Nov.	2.	Frederiek, Dr. H.
1859 May	4.	Bleeker, Dr. H.
1860 Feb.	1.	Baker, The Rev. H.
1860 "	1.	Swinhoe, R., Esq., H. M.'s Consul.
1860 April	4.	Haug, Dr. M.
1861 July	3.	Gosche, Dr. R.
1862 Mar.	5.	Murray, A. Esq.
1863 Jan.	5.	Goldstücker, Dr. T.
1863 July	4.	Barnes, R. H., Esq.
1866 May	7.	Schlagintweit, Prof. E. von
1866 "	7.	Sherring, Rev. M. A.
1868 Feb.	5.	Foucaux, M. F. H.
1868 "	5.	Holmboe, Prof.
		Europe
		Alexandria
		Damascus
		Munich
		Beyrout
		Bussorah
		Bombay
		Ceylon
		Giesen
		Batavia
		Batavia
		E. Malabar
		Amoy
		Punah
		Berlin
		London
		London
		Ceylon
		Munich
		Benares
		Paris
		Christiania

### LIST OF ASSOCIATE MEMBERS.

1835 Oct.	7.	Stephenson, J., Esq.
1838 Feb.	7.	Karāmat Alī, Sayyid.
1843 Dec.	6.	Long, Rev. J.
1865 May	3.	Dall, Rev. C. H.
		Europe
		Hooghly
		Calcutta
		Calcutta

## LOSS OF MEMBERS DURING 1871.

## BY RETIREMENT.

C. F. Amery.	Lahore
Capt. J. P. Basevi, R. E.	Dera
T. Thomas, Esq.,	Lucknow
W. H. Stevens, Esq.	Darbanga
The Hon'ble Sir W. Grey, K. C. S. I.	Calcutta
L. B. Bowring, Esq.	Europe
W. C. Bonnerjee, Esq.	Calcutta
J. Schroeder, Esq.	Calcutta
Lieut.-Col. C. Macgregor.	Simla
Dr. S. C. Mackenzie.	Calcutta
R. J. Leeds, Esq.	Banda
Capt. R. D. Osborn.	Calcutta
Lieut. W. A. J. Wallace.	Calcutta
Col. A. D. Dickens,	Calcutta
Dr. H. Warth,	Panjab
J. F. Cockburn, Esq.	Kanoo Junction, E. I. R.
Dr. J. M. Fleming.	Kundua Nemar, Central Provinces

BY THE ELECTION BEING CANCELLED ON ACCOUNT OF NON-COMPLIANCE  
WITH THE RULES OF THE SOCIETY.

Nawab Sir Sheriful Omra Bahadur.	Madras
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## STRUCK OFF.

A. G. Walker, Esq.	Onao, Oudh
C. J. Wilkinson, Esq.	Calcutta
Dr. C. Williams.	Rangoon
C. B. Garrett, Esq., C. S.	Sarun
F. J. Chambers, Esq.	Lucknow

## BY DEATH.

The Hon'ble J. P. Norman.	Calcutta
The Ven'ble Archdeacon J. H. Pratt, M. A.	Calcutta

[APPENDIX.]

ABSTRACT STATEMENT  
OF  
RECEIPTS AND DISBURSEMENTS  
OF THE  
ASIATIC SOCIETY OF BENGAL  
FOR  
THE YEAR 1871.



# STATEMENT

## *Abstract of the Cash Account*

### RECEIPTS.

		1871.	1870.
<b>ADMISSION FEES.</b>			
Received from Members, ...	Rs. 1,472 0 0	1,472 0 0	864 0 0
<b>SUBSCRIPTIONS.</b>			
Received from Members, ...	... 7,044 7 0	7,044 7 0	8,812 10 0
<b>PUBLICATIONS.</b>			
Sale proceeds of Journal and Proceedings, ...	706 9 3		
Subscriptions to ditto, ...	952 6 0		
Refund of Postage Stamps, ...	26 15 0		
Ditto of Freight, ...	3 8 0		
Ditto of Printing charges, ...	40 0 0		
		1,729 8 3	1,903 1 3
<b>LIBRARY.</b>			
Sale proceeds of Books, ...	359 11 3		
Refund of Freight, ...	8 0 0		
Ditto of Postage Stamps, ...	3 8 0		
		371 3 3	752 14 0
<b>SECRETARY'S OFFICE.</b>			
Received Commission on purchase of Postage Stamps, &c., ...	14 1 1		
Ditto, Fine, ...	7 10 0		
Refund of the amount from Narpat Sinha Jemadar, ...	10 12 9		
		32 7 10	287 6 0
<b>CONSERVATION OF SANSKRIT MSS.</b>			
Received from the Accountant General of Bengal in part of the amount sanctioned towards the Conservation of Sanskrit MSS., being the 2nd half of 1870-71, ...	1,550 0 0		
Ditto, ditto, the 1st half of 1871-72, ...	1,550 0 0		
Sale proceeds of 7 Copies of Notices of Sanskrit MSS., ...	7 0 0		
Refund of amount paid for copying Mithātithi on the 27th April, 1871, ...	23 4 0		
Ditto, ditto, for copying Madana Pārijat, ...	13 13 0		
		3,144 1 0	3,703 2 9
<b>VESTED FUND.</b>			
Received Interest on the Government Securities from the Bank of Bengal, ...	110 0 0		
Less income Tax on ditto, ...	1 2 0		
		108 14 0	
<b>O. P. FUND.</b>			
Received on account of Loan, ...	656 3 6		
		656 3 6	
<b>MISCELLANEOUS.</b>			
Col. E. T. Dalton, Ethnology of Bengal, ...	10,000 0 0		
Messrs. Williams and Norgate, ...	5 0 0		
Dr. F. Stoliczka, ...	50 6 3		
Wali-collah Sayyid, ...	548 14 8		
B. Quaritch, Esq., ...	6 6 0		
E. T. Atkinson, Esq., ...	31 4 0		
	10,641 14 11		
Carried over, Rs. 14,563 12 10			

No. 1.

*of the Asiatic Society for 1871.*

## DISBURSEMENTS.

PUBLICATIONS.	1871.	1870.
Paid Freight for sending Journal and Proceedings to Messrs. Williams and Norgate,	105 7 0	
Ditto Lithographing and Engraving charges,	1,437 7 0	
Ditto Printing charges, ..	3,253 2 6	
Ditto Commission on Sale of Books, &c., ...	73 5 4	
Ditto Binding charges, ..	6 0 0	
Ditto Paper for plates, &c., ...	129 11 9	
Ditto Purchase of Postage Stamps, ...	260 9 0	
Ditto Petty Charges, ..	8 4 3	
	<hr/>	
	5,273 14 10	5,239 13 5

## LIBRARY.

Paid Messrs. Williams and Norgate for purchase of Library Books as per their draft dated, 18th July, 1871, ...	1,255 9 4	
Ditto Salary of the Librarian, ...	840 0 0	
Ditto Establishment, ...	120 0 0	
Ditto Commission on Sale of Books, ...	33 9 2	
Ditto Purchase of Books, ...	100 0 0	
Ditto Landing Charges, ...	15 6 0	
Ditto Book Binding, ...	105 12 0	
Ditto Subscription to the Medical Gazette, ...	15 0 0	
Ditto Salary of Pankhaman, ...	40 0 0	
Ditto Postage Stamps, ...	4 3 0	
Ditto Bearing Postage, ...	1 9 3	
Ditto Petty Charges, ...	3 14 0	
	<hr/>	
	2,540 14 9	2,472 3 3

## SECRETARY'S OFFICE.

Paid General Establishment, ...	370 12 9	
Ditto Secretary's Office Establishment, ...	1,592 0 0	
Ditto Purchase of Postage Stamps, ...	134 10 2	
Ditto ditto of Stationery, ...	90 0 0	
Ditto Insufficient Postage, ...	1 6 4	
Ditto Bearing Postage, ...	2 13 2	
Ditto Meeting Charges, ...	159 13 0	
Ditto Commission on Collecting Subscriptions, ...	41 4 3	
Ditto Salary of Mali, ...	57 0 0	
Ditto Subscription to the Army List, ...	15 0 0	
Ditto Ditto, Directory, ...	12 0 0	
Ditto for preparing a Teak wood Board, ...	28 0 0	
Ditto Engraving and Printing charges, ...	78 0 0	
Ditto Donation to the Piddington Fund, ...	100 0 0	
Ditto Advertising charges, ...	7 12 0	
Ditto Editing charges for the Annual account-current of 1870, ..	75 0 0	
Ditto repairing a Clock, ...	8 0 0	
Ditto for a Marble Pedestal for Dr. Falconer's bust, ...	86 0 0	
Ditto fee to the Bank of Bengal for stamping blank cheques, ...	1 9 0	
Ditto Petty Charges, ..	57 9 6	
	<hr/>	
	2,918 10 2	
	<hr/>	
	2,187 13 0	
Carried over, Rs. 10,733	7 9	

## RECEIPTS.

1871.

1870.

Brought over, Rs. 10,641 14 11			1871.	1870.
W. Dathoit, Esq., ...	...	...	1 12 6	
A. E. Gaugh, Esq., ...	...	...	0 1 10	
R. J. Leeds, Esq., ...	...	...	2 9 6	
G. E. Ward, Esq., ...	...	...	2 0 0	
W. Stokes, Esq., ...	...	...	0 5 0	
Harigopal Padye, Esq., ...	...	...	0 2 0	
The Rev. F. Foulkes, ...	...	...	0 4 0	
The Government North-Western Provinces, ...	...	...	21 12 0	
Babu Rakhal Dass Halder, ...	...	...	0 8 0	
Col. J. O. Haughton, ...	...	...	10 1 0	
Jugul Kissors, ..	...	...	11 12 0	
F. S. Growse, Esq., ..	...	...	4 2 0	
Dr. G. W. Leitner, ...	...	...	1 12 0	
L. Schwendler, Esq., ...	...	...	8 10 9	
Babu Rasavihari Vasa, ...	...	...	0 14 0	
Major M. W. Carr, ..	...	...	0 11 0	
W. L. Heeley, Esq., ..	...	...	0 6 0	
			<hr/>	<hr/>
			10,709 10 6	

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 Carried over, Rs. 25,268 7 4

## DISBURSEMENTS.

1871.

1870.

Brought over, Rs. 10,733 7 9

## CONSERVATION OF SANSKRIT MSS.

Paid Salary for preparing Catalogue of Sanscrit MSS., ...	300	0	0			
Ditto ditto for Collecting Materials for Catalogue of MSS., ...	379	8	5			
Ditto ditto for translating the Sanscrit Catalogue, ...	112	10	8			
Ditto Babu Rajendra Mitra, as advance for purchase of Sanscrit MSS., ...	400	0	0			
Ditto Printing Charges of Notices of Sanscrit MSS., ...	641	8	0			
Ditto for Stationery, ...	14	5	0			
Ditto for Packing Charges, ...	24	14	0			
Ditto Postage for sending Notices of Sanscrit MSS., ...	7	2	0			
Ditto Freight for ditto ditto, ...	43	6	0			
Ditto Banghy expenses for ditto ditto, ...	7	8	0			
Ditto Advertising Charges, ...	10	5	6			
Ditto Copying MSS., ...	13	13	0			
Ditto Khurrua cloth, and Pasteboard & Co. for Patahs for binding Sanscrit MSS., ...	53	2	0			
Petty Charges, ...	3	15	3			
				2,012	1 10	1,527 6 6

## VESTED FUND.

Paid Commission to the Bank of Bengal for drawing interest on the Government Securities, ...				0	4	4
						0 4 4

## BUILDING.

Paid House rate, ...	432	0	0			
Ditto Police and Lighting rate, ...	210	0	0			
Ditto Water rate, ...	235	3	2			
				877	3 2	910 10 3

## O. P. FUND.

Paid on Loan, ...	274	9	9			
				274	9 9	

## MISCELLANEOUS.

Col. B. T. Dalton, Ethnology of Bengal, ...	7,500	0	0			
Sayyid Walli-ollah, ...	491	6	6			
F. S. Growse, Esq., ...	5	14	0			
The Government, North-Western Provinces, ...	13	8	0			
S. Lobb, Esq., ...	6	6	0			
Col. C. M. Macgregor, ...	0	9	9			
G. E. Fryer, Esq., ...	0	10	0			
E. T. Atkinson, Esq., ...	23	12	0			
W. Oldham, Esq., ...	0	13	0			
Dr. C. Valentyn, ...	0	4	0			
Col. J. C. Haughton, ...	8	0	0			
J. G. Delmerick, Esq., ...	1	2	0			
Dr. G. W. Leitner, ...	1	12	0			
L. Schwondlor, Esq., ...	8	10	9			
G. Nevil, Esq., ...	2	5	0			
Jugal Kishore, ...	11	12	0			
Guru Churn Doss, ...	0	2	0			
J. Wood-Mason, Esq., ...	3	3	6			
Dr. F. Stoliczka, ...	6	8	0			

8,091 10 6

Carried over, Rs. 13,897 10 10

## RECEIPTS.

1871.

1870.

Brought over, Rs. 25,263 7 4

## BALANCE OF 1870.

In the Bank of Bengal, *vis.* account-current

Dr. J. Muir, ...	...	898	10	0	
Ditto Conservation of Sanscrit MSS.,	...	1,717	1	9	
Ditto Asiatic Society, ...	...	2,661	6	0	
					5,277 1 9

Cash in hand, ...	...	...	...	125	15	3
				Rs.	30,671	8 4

## DISBURSEMENTS.

1871.

1870.

	Brought over, Rs.	8,091 10	6 13,897 10 10
Babu Udaya Chanda Datta, ...	...	0 9 0	
Messrs. Trübner and Co., ...	...	9 4 9	
Messrs. Asher and Co., ...	...	12 4 0	
W. Irvine, Esq., ...	...	5 15 6	
J. Beames, Esq., ...	...	2 1 0	
Dr. J. B. Baxter, ...	...	0 6 0	
		<u>8,122 2 9</u>	

## BALANCE.

In the Bank of Bengal, viz. account-current

Dr. Muir, ..	...	898 10 0	
Ditto Conservation of Sanscrit MSS.,	...	2,849 0 11	
Ditto Col. Dalton, Ethnology of Bengal,	...	2,450 12 0	
Ditto Asiatic Society, ...	...	2,236 5 7	
		<u>8,434 12 6</u>	
Cash in hand, ...	...	216 14 3	
		<u>Rs. 30,671 8 4</u>	

Errors and Omissions excepted,

(Sd.) BUDDINATH BYSACK,

Cashier,

Asiatic Society, Bengal.

Audited and found correct,

(Sd.) F. W. PETERSON,

D. WALDIE.

# STATEMENT

## *Abstract of the Cash Account,*

RECEIPTS.				1871.	1870.
<b>ORIENTAL PUBLICATIONS.</b>					
Received by Sale of Bibliotheca Indica, ...	2,405	3	0		
Ditto by Subscription to do. ...	94	0	0		
Ditto Refund of Postage and Packing charges, ...	81	14	0		
				2,581	1 0 1,911 5 6
<b>GOVERNMENT ALLOWANCE.</b>					
Received from the General Treasury at 500 Rs. per month, ...	6,000	0	0		
Ditto ditto additional grant for the publication of Sanskrit works, at 250 Rs. per month, ...	3,000	0	0		
				9,000	0 0 9,000 0 0
<b>VESTED FUND.</b>					
Received Interest on the Government Security by the Bank of Bengal, ...	87	8	0		
Ditto by Sale of a new 5 per cent. Government Security, ...	3,500	0	0		
Ditto ditto Premium on do. ...	203	12	0		
Ditto ditto Interest on do. ...	23	9	9		
	3,727	5	9		
Less Commission and Brokerage on Selling Government Security, ...	3	14	6		
Ditto Income Tax on the Interest, ...	0	3	7		
			4 2 1		
			3,723	3 8	
				3,810	11 8 175 0 0
<b>ASIATIC SOCIETY OF BENGAL.</b>					
Received on Loan, ...	274	9	9		
				274	9 9
<b>MISCELLANEOUS.</b>					
Babu Luchmun Singh, ...	4	0	0		
Chib Ghanano Sarawali, ...	2	14	6		
J. Bisch, Esq., ...	0	4	0		
N. Muller Row, Esq., ...	7	8	0		
Babu Tarini Churn Chuckerbutty, ...	1	8	0		
Babu Sadasakh Lall, ...	4	8	0		
Pandita Damaru Vallabha, ...	43	0	0		
Babu Nobin Chunder Roy, ...	2	7	0		
Pandita Chunder Kanta Tarkalanker, ...	1	11	0		
Babu Ram Chunder Bose, ...	35	8	0		
C. W. Macm, Esq., ...	40	0	0		
A. Royno Gopall, Esq., ...	0	5	0		
The Principal of the Dacca College, ...	1	2	0		
G. Jyanna, Esq., ...	2	12	0		
Babu Pearilall, ...	0	4	0		
Munshree Gangapershad, ...	2	8	0		
Ram Kissen G. Bhauder Kur, ...	0	2	0		
	150	5	6		
Carried over, Rs. 15,666	6	5			

## No. 2.

*Oriental Publication Fund, 1871.*

## DISBURSEMENTS.

ORIENTAL PUBLICATIONS.			1871.	1870.
Paid Commission on Sale of Books,	...	250 6 0		
Packing Charges,	...	47 0 0		
Postage Stamps,	...	149 8 6		
Advertising Charges,	...	400 0 0		
Freight,	...	328 2 0		
Bearing Postage,	...	0 5 0		
Printing Charges,	...	12 10 0		
Petty Charges,	...	2 14 9		
		— — —	1,190 14 3	1,364 8 0
VESTED FUND.				
Paid Commission to the Bank of Bengal for drawing Interest on the Government Securities,	...	0 3 6		
Renewing a Government Security,	...	1 0 0		
Commission on Sale of the Government Security,	...	6 10 7		
Brokerage on ditto ditto,	...	3 2 0		
		— — —	11 0 1	0 7 0
LIBRARY.				
Paid Purchase of Books,	...	185 14 6		
Book Binding,	...	5 0 0		
		— — —	190 14 6	520 6 0
CUSTODY OF ORIENTAL WORKS.				
Paid Salary of the Librarian,	...	360 0 0		
Establishment,	...	574 0 0		
Stationery,	...	18 6 0		
Fee for Stamping Cheques,	...	4 11 0		
Ditto for auditing the Annual Account for 1870,	...	75 0 0		
Petty Charges,	...	51 2 6		
		— — —	1,083 3 6	1,225 1 0
ASIATIC SOCIETY OF BENGAL.				
Paid on account of Loan,	...	656 3 6		
		— — —	656 3 6	
CATALOGUE OF SANSKRIT MSS.				
Paid Salary for Cataloguing Sanskrit MSS.,	...	360 0 0		
		— — —	360 0 0	278 0 0
COPYING MSS.				
Paid Copying Charges,	...	198 5 0		
		— — —	198 5 0	71 3 6
AIN I AKBARI.				
Paid Munshi allowance,	...	390 0 0		
Ditto Printing Charges,	...	730 8 0		
		— — —	1,120 8 0	1,617 13 0
TAN'DYA MAHĀ BRĀHMANA.				
Paid Editing and Printing Charges,	...	1,312 12 0		
		— — —	1,312 12 0	3,593 12 0
MĪMĀNSĀ DARSANA.				
Paid Editing and Printing Charges,	...	539 10 0		
		— — —	539 10 0	427 2 0
Carried over, Rs.			6,663 6 10	



RECEIPTS.				1871.	1870.
	Brought over, Rs	150	5	6 15,666	6 5
M. Sasha Giri Sastri,	...	11	8	0	
Ram Lall Misser, ...	...	0	15	0	
Vadlamannati Damsdarayya, ...	..	1	2	0	
		<hr/>		163	14 6

Carried over, Rs. 15,830 4 11

DISBURSEMENTS.		1871.	1870.
Brought over, Rs.		6,663	6 10
<b>NEISINHA TAPINI.</b>			
Paid Editing and Printing Charges,	... 960 13 0		
Ditto Postage and Registering fee for return- ing MSS., ...	... 0 6 0		
	<u>          </u>	961	3 0
<b>MAASTE ALAMOIRI.</b>			
Paid Editing and Printing Charges,	.. 550 0 0		
	<u>          </u>	550	0 0 614 0 0
<b>BIOGRAPHICAL DICTIONARY.</b>			
Paid Editing and Printing Charges,	... 1,126 9 0		
	<u>          </u>	1,126	9 0
<b>BRAHMA SUTRA.</b>			
Paid Printing Charges,	... 278 0 0		
	<u>          </u>	278	0 0
<b>SAMA VEDA.</b>			
Paid Editing and Printing Charges,	... 984 9 0		
	<u>          </u>	984	9 0 108 8 6
<b>GOPATHA BRAHMANA.</b>			
Paid Printing Charges,	... 232 3 0		
	<u>          </u>	232	3 0 96 0 0
<b>LATYAYANA SRAUTA SUTRA.</b>			
Paid Printing Charges,	... 232 3 0		
	<u>          </u>	232	3 0 2,393 5 0
<b>MATRI UPANISHAD.</b>			
Paid Printing Charges,	... 109 6 0		
	<u>          </u>	109	6 0 18 2 3
<b>TAITTIRIYA BRAHMANA.</b>			
Paid Printing Charges,	... 310 10 0		
	<u>          </u>	310	10 0 349 0 0
<b>TAITTIRIYA SANHITA.</b>			
Paid Editing and Printing Charges,	... 339 12 0		
	<u>          </u>	339	12 0 96 0 0
<b>POEMS CHAND.</b>			
Paid Freight and Packing Charges for send- ing MSS., ...	... 8 15 0		
	<u>          </u>	8 15 0	7 9 0
<b>FARHANG RASHIDI.</b>			
Paid Editing and Printing Charges,	... 703 0 0		
	<u>          </u>	703	0 0 468 12 0
<b>TAITTIRIYA ARANYAKA.</b>			
Paid Editing and Printing Charges,	... 396 8 0		
	<u>          </u>	396	8 0 380 12 0
<b>CHATURVARGA CHINTAMANI.</b>			
Paid Editing and Printing Charges,	... 656 6 0		
	<u>          </u>	656	6 0
<b>CHHANDA SUTRA.</b>			
Paid Editing and Printing Charges,	... 328 3 0		
	<u>          </u>	328	3 0
<b>GOSIL SUTRA.</b>			
Paid Editing and Printing Charges,	... 402 6 0		
Ditto Banghy Expenses &c., for sending Sanscrit Books &c., to Pandita Chandra Kanta Tarkankar, ...	... 3 12 0		
	<u>          </u>	406	2 0
<b>TAITTIRIYA PRATISAKHYA.</b>			
Paid Editing and Printing Charges,	... 328 3 0		
	<u>          </u>	328	3 0
Carried over, Rs.		14,615	2 10

	RECEIPTS.	1871.	1870.
BALANCE OF 1870.	. Brought over, Rs.	15,830 4 11	
In the Bank of Bengal,	...	836 4 7	

Rs. 16,666 9 6

## DISBURSEMENTS.

1871.

1870.

		Brought over, Rs.	14,615	2	10
K. Roghunath Row, ...	...	...	137	12	6
Babu Heetalal Misser, ...	...	...	1	1	0
Babu Luchmun Singh, ...	...	...	8	2	0
Babu Tarini Churn Obuckerbutty, ...	...	...	1	8	0
Damara Jetta, ...	...	...	17	10	6
The Principal of the Dacca College, ...	...	...	1	2	0
Babu Brojo Bhusan Dass, ...	...	...	1	7	0
J. Bisch, Esq., ...	...	...	1	3	0
Sadaskh Lall, Esq., ...	...	...	3	12	0
N. Muller Row, Esq., ...	...	...	7	8	0
Damara Vallabha, ...	...	...	43	0	0
Babu Ram Chunder Bose, ...	...	...	14	8	0
Major C. W. Carr, ...	...	...	0	10	0
Ramkrishna G. Bhandarkur, ...	...	...	3	3	0
Munshee Gunga Persad, ..	..	..	5	11	6
				243	2 6
BALANCE.					
In the Bank of Bengal, ...	...	...	1,786	5	7
Cash in hand, ..	...	...	21	14	7
				1,808	4 2
				Rs. 16,666	9 6

Errors and Omissions excepted,

(Sd.) BUDDINATH BYSACK,

*Cashier,**Asiatic Society, Bengal.*

Audited and found correct,

(Sd.) F. W. PETERSON,

D WALDIE.

## STATEMENT No. 3.

*Shewing the Assets and Liabilities of the Asiatic Society of Bengal on the 1st July. 1872.*

ASSETS.		1871.	1870.	LIABILITIES.		1871.	1870.
CASH.				Salary and Establishment for December, 1871, ... ..		300 0 0	241 14 8
In the Bank of Bengal,	...	8,434 12 6	5,277 1 9	Printing Charges of Journal and Proceedings for 1871, (actual and estimate.) ...		2,350 0 0	1,494 15 0
Cash in hand, ...	...	216 14 3	125 15 3	Plates &c., for Journal, ...		300 0 0	275 12 0
Government Securities,	...	2,000 0 0	2,000 0 0	Messrs. Williams and Norgate, ...		200 0 0	600 0 0
		10,651 10 9	7,403 1 0	House rate &c., ...		225 0 0	156 0 0
OUTSTANDING.				Conservation of Sanscrit MSS., ...		2,849 0 11	1,717 1 9
Admission fees, ...	...	384 0 0	96 0 0	Dr. J. Muir, ...		898 10 0	898 10 0
Subscription, ...	...	5,086 11 8	4,432 6 8	Ethnology of Bengal, ...		2,450 12 0	0 0 0
Sale of Journal, ...	...	383 13 11	275 6 11				
Subscription of do.	...	996 3 9	744 4 0				
Sale of Library Books,	...	351 7 0	382 6 0				
Due from O. F. Fund,	...	136 5 2	517 14 11				
		Rs. 7,338 9 6	6,448 6 6			Rs. 9,573 6 11	5,384 5 5

Errors and Omissions excepted,  
 Sd. BUDDINATH BRACK,  
*Cashier,*  
*Asiatic Society, Bengal.*  
 Audited and found correct,  
 F. W. PETERSON,  
 D. WALDIE.

*Shewing the Assets and Liabilities of the Oriental Publication Fund, 1st Jny. 1872.*

Errors and Omissions excepted,  
(Sd.) BUDDINATH BISACK,  
Cashier.  
Asiatic Society, Bengal.  
Audited and found correct,  
(Sd.) F. W. PETERSON,  
D. WALDIE.

# STATEMENT No. B. .

## Conservation of Sanscrit MSS. in Account Current with the Asiatic Society of Bengal.

Cr.		Dr.	
Balance, of 1870, ...	1,717 1 9	Amount spent in 1871, ...	Ra. 1,998 4 10
Received from the Government of Bengal, being the half sum sanctioned, annually Rs. 3,100, towards the Conservation and Publication of Sanscrit MSS., for the 2nd half of 1870-71, ...	1,550 0 0	Balance, ...	... 2,849 0 11
Ditto ditto for the 1st half of 1871-72, ...	1,550 0 0		4,847 5 9
Sale proceeds of 6 Copies of Notices of Sanscrit MSS., ...	7 0 0		
Refund of the amount paid to Poresnath Chatterjee, for Copying Medhalithi on the 27th April, 1870, ...	23 4 0		
	<u>4,847 5 9</u>		
	Ra. 4,847 5 9		Ra. 4,847 5 9

xxx

Errors and Omissions excepted,  
(Sd.) BUDDINATH BYSACK, Cashier,  
Asiatic Society, Bengal.  
Audited and found correct,  
(Sd.) F. W. PETERSON,  
D. WALDIE.

PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR JANUARY, 1872.

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A meeting of the Society was held on Wednesday the 3rd instant, at 9 o'clock, P. M.

The Hon'ble J. B. Phear, President, in the Chair.

The minutes of the last meeting were read and confirmed.

Presentations were announced—

1. From Dr. C. R. Francis, Dinapore, a box of 'petrified seeds,' from near Rájmahall. The following extract of a letter from MR. E. STEWART, Extra Assistant Commissioner, Rájmahall, accompanied the donation—

'In regard to the petrified seeds, they are found on the borders of a tank at Burhait, about thirty miles from Rájmahall in the centre almost of the Rájmahall Hills.

'The tank is said to be a very ancient one, dug by some former Rájah, and the seeds are found among the soil immediately on its banks; no doubt this soil contains a good deal of lime and other calcareous ingredients.

'The natives suppose that the seeds were dropped by former travellers who used to sit on its banks and eat their rice, dall, &c.; but I am not entirely free from doubt in my own mind as to whether they are seeds at all.'

2. From H. F. Blanford, Esq.—A copy of an English and Tamil Dictionary; also a copy of an English Telugu and Tamil Vocabulary.

3. From the author—A copy of a Speech on the Metric System, delivered by Mr. Stevenson, M. P., in the House of Commons.

4. From the author—Two copies of 'The Durgá Pújá,' by Babu Pratápachandra Ghosha, B. A.



5. From Mr. J. M. Foster, Asám—Three large and three small Asám silver coins.

BABU PRATA'PACHANDRA GHOSHIA, *Assistant Secretary*, submitted the following note regarding these coins—

1. A silver rupee, octagonal, of Rájes'vara Sīṅha. A rupee of the same prince and bearing the same legend is figured in Marsden's 'Numismata Orientalia.' But the date there given is S'ake 1674, corresponding to A. D. 1752. This coin, however, bears 1690, *i. e.*, A. D., 1768. It is important as shewing the latest date of the reign of that prince. This prince appears from the coin to have reigned at least for sixteen years. Marsden, however, describes a silver two-anna piece of the same prince, dated 1620, which would extend his reign to fifty years. In this coin also, at the bottom of the obverse area in the margin, is impressed the figure of what appears to be a winged dragon.

2. A silver eight-anna piece, octagonal of Rájes'vara Sīṅha, not figured in Marsden.

I. Area—S'rí S'rí Rájes'vara Sīṅha Nṛpasya, of the twice illustrious prince Rájes'vara Sīṅha.

II. Area—S'rí S'rí S'ivapada Paráyanasya, of the twice illustrious devotee of the feet of S'iva.

This coin bears no date.

3. A silver four-anna piece, octagonal, not figured in Marsden, of the wife of S'iva Sīṅha.

I. Area—S'rí S'rí S'iva Sīṅha Mahípa.

II. Area—Jáyá S'rí Madamvikánám, of the twice illustrious king S'iva Sīṅha's wife, fortunate Amviká. At the bottom the century of the date is preserved 16.

From Marsden we find that S'iva Sīṅha reigned in 1662, agreeing with 1740, A. D.

4. A silver two-anna piece, octagonal, of Gaurinátha Sīṅha, not figured in Marsden.

I.—S'rí S'rí Gaurinátha.

II.—Sīṅha Nṛpasya, of the twice illustrious Gaurinátha Sīṅha, ruler of men. It bears no date. Gaurinatha reigned about S'ake 1706, or 1784, A. D.

5. A silver anna piece, octagonal, of the same prince, not figured in Marsden.

I.—S'rí Gaurinátha.

II.—Sīṅha Nṛpasya.

6. A silver half-anna piece, octagonal, of the same prince not figured in Marsden.

I.—S'rí Gau—

II.—rinátha Sīṅha.

The following gentleman duly proposed and seconded at the last meeting was balloted for, and elected an Ordinary Member—

W. D. Butcher, Esq., M. D.

The following gentlemen are candidates for ballot at the next meeting—

M. Sashagiri Sastri, B. A., Professor of Sanscrit, Presidency College, Madras, proposed by Babu Rájendralála Mitra, seconded Mr. H. Blochmann.

J. Minto, Esq., Debrogarh, Asám, proposed by L. Schwendler, Esq., seconded by the Hon'ble J. B. Phear.

The following members have intimated their desire to withdraw from the Society—W. Oldham, Esq., LL. D., Gházípur; Lieut.-Col. J. J. McLeod Innes.

The following letter was read—

*From COL. SIR A. PELAYRE, regarding the continuation of his history of the Burmah Race and certain gold coins from the Island of Cheduba.*

'I take the liberty to enclose you a memorandum, regarding some gold coins found on Cheduba, some thirty years ago, as no doubt one of the same find is referred to in the Proceedings of the Society for April last. There were found, I remember hearing at the time at Sandoway, where I then was, some two hundred, and being not far above high water mark it was conjectured they had been deposited by some ship-wrecked persons. I collected at different times some 10 or 12 of these from various natives, and sent a portion, six or seven I think, to the Society for inspection. Unfortunately they were all stolen along with the whole Society's collection. I had two which I sent home, and only came across them last year. I showed them to Sir W. Elliot with the result I have mentioned in the enclosed memorandum. It is possible that some of the original coins may still be found among the villagers of Cheduba. It would be curious to see if any of them have a device other than the boar, which of course is the incarnation of Vishnu.

'With reference to what is stated as to the coin having been struck in the reign of Maha Paramat, I would observe that the era of the Buddhist religion commences from the attainment of Nirvána by Gautama, say 543, B. C; the common era from 538, or rather 539, A. D.

'I have been unable to continue my paper on the history of the Burma Race, as some of my Burmese MSS. are missing. I hope, however, to recover them. In the meantime, I am preparing a paper on the history of Pegú, which if acceptable for the Journal, I will send hereafter.'

#### *Memorandum.*

'In the Proceedings of the Asiatic Society of Bengal for April, 1871, there is a notice of a gold coin received from the Island of Cheduba, and presented by Colonel Hamilton. From the account, it is probable that the coin is one of a large number discovered on Cheduba some thirty years ago. Some of them

were figured and described by Captain T. Latter in the Journal for 1846. Coins of a similar type have, however, been described by Sir Walter Elliot in a paper which he published in the Madras Journal of Literature and Science. He describes them as coins of the Chalukya Princes, of whom the Eastern line reigned at Rājāmandri, and the Western at Kalyān. The central figure on the coins described by Captain Latter was a boar, a device which the Chalukya princes stamped on their coins throughout a long period of time. Around the central figure were other objects, a ch'hatra, and other regalia. The letters, Sir Walter Elliot decides, are old Telugu characters. I have lately shown to Sir Walter two coins of those originally found on Cheduba. He has not yet deciphered the characters, but thinks they are undoubtedly old Telugu, and that the coins belong probably to the fifth century of the Christian era.'

The following papers were read—

TRANSLATIONS FROM THE TARIKH I FIRUZSHAHI. *Ziā'uddīn's Preface.*

—By E. C. BAYLEY, ESQ., C. S., C. S. I.

*The Reign of Mu'izzuddīn.*—By P. WHALLEY, ESQ., C. S.

These papers will be printed in the Journal for 1871 and 1872.

The receipt of the following communications was announced—

1. *The Swans of India.*—By W. BROOKS, ESQ., C. S., ETA'WAH.

2. *On a New Species of Phyllopus.*—By W. BROOKS, ESQ., C. E., ETA'WAH.

3. *Third List of Birds obtained in the Khasi and Garo Hills, with some corrections, &c., to the former lists.*—By MAJOR H. H. GODWIN-AUSTEN.

#### LIBRARY.

The following additions have been made to the library since the meeting held in December 1871.

#### *Presentations.*

\*.\* Names of Donors in Capitals.

The Transactions of the Linnean Society of London, Vol. XXVII., Part III.—THE LINNEAN SOCIETY.

Abhandlungen der Königlich Akademie der Wissenschaften zu Berlin, 1870.—KÖNIGL. AKADEMIE DER WISSENSCHAFTEN ZU BERLIN.

Monatsbericht der K. Pr. Akademie der Wissenschaften, August, 1871.—K. PR. AKADEMIE, BERLIN.

Bijdragen tot de Taal land en Volkenkunde van Nederlandsch Indie, Vol. V, 2nd and 3rd stuk.—VOLKENKUNDE VAN NEDERLANDSCH INDIE.

Natuurkundig Tijdschrift voor Nederlandsch Indie, Dl. XXXI. Aflevering 4—6.—NATUURKUNDIGE VEREENIGING IN NEDERLANDSCH INDIE.

Jahrbuch, Band XXI. No. 2.—K. K. GEOLOGISCHE REICHSANSTALT.

Annales de la Société Impériale d'Agriculture, Histoire Naturelle, et Arts utiles de Lyon, 4 série, Tome I.—SOCIÉTÉ IMPÉRIALE D'AGRICULTURE, HISTOIRE NATURELLE ET ARTS UTILES DE LYON.

Bulletin de la Société de Géographie, 1871, September, October.—SOCIÉTÉ DE LA GÉOGRAPHIE, PARIS.

Transactions and Proceedings of the Royal Society of Victoria, Part II. Vol. II.—THE ROYAL SOCIETY OF VICTORIA.

Two Copies of 'The Durga Puja,' with Notes and Illustrations, by Babu Pratāpachandra Ghosha, B. A.—THE AUTHOR.

Scripture Truth in Oriental Dress, by Rev. J. Long.—THE AUTHOR.

On the Constitution of the Solid Crust of the Earth, by Archdeacon J. H. Pratt, M. A., F. R. S.—THE AUTHOR.

The Rāmāyana, Vol. II. No. 12, edited by Hemchandra.—THE EDITOR.

The Christian Spectator, January, 1872.—THE EDITOR.

The Calcutta Journal of Medicine, October, 1871.—THE EDITOR.

Professional Papers on Indian Engineering, 2nd series, Vol. I. No. 2.—THE EDITOR.

A Pocket Dictionary of English and Tamil, by Capt. J. Ouchterlony.—H. F. BLANFORD, Esq.

A Polyglot Vocabulary of the English, Telooogo and Tamil languages.—H. F. BLANFORD, Esq.

A Descriptive Catalogue of Sanskrit, Pali, and Singalese Literary Works of Ceylon, by J. D'Alwis, M. R. A. S., Vol. I.—THE GOVERNMENT OF INDIA, HOME DEPARTMENT.

The Annals of Indian Administration, Vol. XIV. Part II., Vol. XV. Part I.—THE GOVERNMENT OF BENGAL.

Indian Museum, Minutes of the Trustees, April 1870, to March 1871.—THE GOVERNMENT OF BENGAL.

Report on the Administration of the Income Tax in the Lower Provinces, 1869-70.—THE GOVERNMENT OF BENGAL.

Report on the Administration of the Registration Department of Bengal, 1870-71, by H. Beverley, Esq.—THE GOVERNMENT OF BENGAL.

Annual Report on the Insane Asylums in Bengal, 1870, by J. C. Brown, M. D.—THE GOVERNMENT OF BENGAL.

A Narrative of the Drought and Famine which prevailed in the North-Western Provinces, during the years 1868, 1869, and beginning of 1870, compiled by F. Henvey, Esq.—THE GOVERNMENT, NORTH-WEST. PROVINCES.

Selections from the Records of Government, North-Western Provinces, Vol. V. No. 2, Vol. VI. No. 1, Second Series.—THE GOVERNMENT, NORTH-WEST. PROVINCES.

#### *Exchange.*

The Athenæum, August, September, October, 1871.—Nature, Nos. 93 to 109.

*Purchase.*

The Wheel of the Law illustrative of Buddhism by H. Alabaster.—Ikhwānus Safā, translated by J. Dowson.—A Catena of Buddhist Scriptures from the Chinese, by S. Beal.—Kusa Jatakaya, a Buddhistic Legend, with other stories, by T. Stule.—Maha-Vira-Charita, by J. Pickford, M. A.—The Quarterly Review, No. 262, October 1871.—Edinburgh Review, No. 274, October, 1871.—The Ibis, Vol. I. No. 4.—Comptes Rendus, Nos. 15, 16.—Revue des Deux Mondes, 15th October, 1st November, 1871.—The L. E. D. Philosophic Magazine, No. 281, November, 1871.—Revue Archeologique, October, 1871.—Revue Linguistique, Tome Quatrième, 2e Fasc.—Exotic Butterflies, by W. C. Hewitson, Pt. 80, 1871.—Conehologia Iconica, by L. Reeves, Pts. 288, 289.—The Annals and Magazine of Natural History, No. 47, 1871.

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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR FEBRUARY, 1872.

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The Annual Meeting of the Society was held on Wednesday, the 2nd of February, 1872, at 9 o'clock P. M.

The Hon'ble J. B. Phear, President, in the chair.

According to the bye-laws of the Society, the President ordered voting papers to be distributed for the election of Officers and Members of Council for 1872, and appointed Messrs. E. Gay and H. Blanford scrutineers.

While the elections were being made, the President called upon the Secretary to read the Annual Report.

ANNUAL REPORT FOR 1871.

In presenting the Annual Report for 1871, the Council have again the satisfaction of congratulating the Society on its continued prosperity and usefulness, as indicated by the accession of new members, and the number and value of its publications in the Journal and the Bibliotheca Indica.

At the close of last year, the number of Ordinary Members was 446, of which 286 were paying members, 160 being absent in Europe. Of the 286 paying members, there were 112 Resident and 174 Non-resident members.

The number of Ordinary Members elected in 1871 was 57, whilst the Society sustained a loss of 25 members, *viz.*, 2 by death, and 17 by resignation and departure for Europe; 5 were removed from the list of members for non-compliance with the bye-laws, and 1 election was cancelled.

The number of paying members for last year was greater by 20, and the number of elections greater by 29, than in 1870. The following table exhibits the number of paying and absent members for the last 10 years.

Year.	Paying Members.		Absent, do.	Total.
	Resident.	Non-resident.		
1862	229 (104,	125)	82	311
1863	276 (130,	146)	79	355
1864	228 (133,	195)	92	320
1865	267 (136,	131)	109	376
1866	293 (124,	169)	94	387
1867	307 (154,	153)	109	416
1868	294 (159,	135)	133	427
1869	304 (162,	142)	138	442
1870	266 (134,	132)	148	414
1871	286 (112,	174)	160	446

There was one election of an Honorary Member, Mr. C. Darwin having been elected in June last. There was no change in the list of Associate Members.

The Council regret to announce the death of two of their most distinguished Ordinary Members, the Hon'ble J. P. Norman, and the Venerable Archdeacon J. H. Pratt, the latter of whom had been a member since 1839. The Society also lost two of its Honorary Members, Sir J. F. W. Herschel, F. R. S., and Col. Sir P. T. Cautley, K. C. B., F. R. S.

#### Museum.

The Council have continued to carry out the provisions of Act XVII of 1866, and have transferred all Natural Historical and Archæological donations received by them during 1871 to the Trustees of the Indian Museum. A list of these donations will be found in the Appendix to the Proceedings for 1871.

Trustees, on the part of the Society, were, during last year, the President, Mr. W. S. Atkinson, Mr. H. F. Blanford, and Dr. F. Stoliczka.

The Council have much pleasure in observing the present progress of the new Museum building.

The want of sufficient accommodation for the increasing library and publications of the Society, the absence of a reading room, and the crowded state of the Society's Meeting Hall, have for the last six years been felt to be serious obstacles to the usefulness of the Society and the convenience of its members. The Government, however, found means to set aside in last year's budget a most liberal sum for the immediate completion of the new building, and the Council with every satisfaction look forward towards the speedy removal of the temporary inconvenience to which the Society is at present subject. This, however, is still so great, and the loss to the Society so considerable, that the Council have felt it their duty, in the interests of the Society, to apply to Government for a grant of money at the rate of Rs. 400 a month

(the value at which the house is at present assessed) for the time which may elapse till the completion of the new building. The matter is still under consideration with the Supreme Government, and the Council have reason to hope that the application may be successful.

### Finance.

The contributions of members in subscriptions and entrance fees for 1871 amount to Rs. 8,516,7-0, against Rs. 9,676-10, in 1870. There has been a considerable falling off in the regularity of payments, the amount due from members to the end of last year being Rs. 5,300.

Though three-fifths of this sum will, it is hoped, be in a short time collected, the Council would take this opportunity to urge on the members the necessity of punctuality in payments. As the Society entirely depends on the voluntary contributions of its members, it is of the greatest importance that these contributions should be promptly available.

The following table exhibits an abstract of the accounts for 1871.

#### ACTUAL INCOME DURING 1871.

Subscriptions,.....	Rs.	7,044	7	0
Admission fees,.....		1,472	0	0
Publications,.....		1,729	8	3
Library,.....		371	3	3
Secretary's Office, .....		32	7	10
Vested Fund, .....		108	14	0
Sundries, .....		709	10	6
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	Rs.	11,468	2	10
Col. Dalton's Ethnology of Bengal, .....	Rs.	10,000	0	0
Conservation of Sanskrit MSS., .....		3,144	1	0
O. P. Fund, .....		656	3	6
In the Bank of Bengal, 1870,.....		5,403	1	0
<hr/>				
Total Rs.,.....		30,671	8	4

#### EXPENDITURE DURING 1871.

Publications,.....	Rs.	5,273	14	10
Library, .....		2,540	14	9
Secretary's Office, .....		2,918	10	2
Vested Fund,.....		0	4	4
Building, .....		877	3	2
<hr/>				

Carried forward, Rs. 11,610 15 3



Brought forward, Rs.	11,610	15	3
Col. Dalton's Ethnology of Bengal, .....	7,500	0	0
Conservation of Sanscrit MSS., .....	2,012	1	10
O. P. Fund, .....	274	9	9
Miscellaneous, .....	622	2	9
	22,019	13	7
In the Bank of Bengal, .....	8,434	12	6
Cash in hand, .....	216	14	3
Total Rs. ....	30,671	8	4

From this statement it will be seen that the balance in the Bank of Bengal and the cash in hand amounted, in the end of 1871, to Rs. 8,651-10-9. To this is to be added Rs. 2000, held by the Society in Government Securities, making a grand total of Rs. 10,651-10-9. Subtracting from this sum Rs. 2500 on account of Col. Dalton's Ethnology; Rs. 898, the balance of the sum received from Dr. J. Muir; and Rs. 2849, the balance of the sum received from the Government of India on account of cataloguing Sanscrit MSS., *i. e.*, altogether Rs. 6247, held by the Society in trust, a sum of Rs. 4,404-10-9 will be left as the clear credit of the Society at the end of 1871.

The expenditure for 1871 has been kept within the estimate, but has exceeded the estimated Income by Rs. 873-8-10, as will be seen from the following table—

	INCOME.		EXPENDITURE.	
	Estimate.	Actual.	Estimate.	Actual.
Subscriptions, .....	8,500 0 0	7,044 7 0	0 0 0	0 0 0
Admission fees, .....	900 0 0	1,472 0 0	0 0 0	0 0 0
Publications, .....	1,500 0 0	1,729 8 3	5,000 0 0	5,273 14 10
Library, .....	600 0 0	371 3 3	2,600 0 0	2,540 14 9
Coin Fund, .....	0 0 0	0 0 0	100 0 0	0 0 0
Secretary's Office, .....	0 0 0	32 7 10	2,800 0 0	2,918 10 2
Miscellaneous, .....	1,000 0 0	709 10 6	1,000 0 0	622 2 9
Building, .....	0 0 0	0 0 0	1,000 0 0	877 3 2
	12,500 0 0	11,359 4 10	12,500 0 0	12,232 13 8

The following is the estimated income and expenditure of the Society for 1872.

#### ESTIMATED INCOME.

Subscriptions, .....	Rs.	8,500	0	0
Admission fees, .....		1,000	0	0

Carried forward, Rs. 9,500 0 0

Brought forward, Rs.	9,500	0	0
Publications, .....	1,500	0	0
Library, .....	250	0	0
Sundries, .....	800	0	0
Coin Fund, Secretary's Office, Building, ...	0	0	0
Total Rs.,.....	12,050	0	0

## ESTIMATED EXPENDITURE.

Publications, .....	Rs. 5,000	0	0
Library, .....	2,150	0	0
Secretary's Office, .....	3,000	0	0
Sundries, .....	800	0	0
Building, .....	1,000	0	0
Coin Fund,.....	100	0	0
Subscriptions, Admission fees, .....	0	0	0
Total Rs.,.....	12,050	0	0

## Library.

The Library received, in 1871, an addition of 837 volumes or parts of volumes. A considerable number are due to the liberality of the Government of India, the Governments of the several provinces, authors of works, and the following members of the Society—Messrs. J. Wood-Mason, J. T. Wheeler, G. Latham, A. M. Broadley, H. Blochmann, H. F. Blanford; Drs. G. W. Leitner, J. E. T. Aitchison, J. Anderson; Rev. J. Long, Rev. C. H. Dall, Prof. Weber; Bábús Rájendralála Mitra, Pratápachandra Ghosha, Dhanpati Singh Rai Bahádur, Thakur Giri Prasád; and the late Venerable Archdeacon Pratt.

Other books were obtained by purchase on the recommendation of the Library Committee, or in exchange for the publications of the Society. Detailed lists of the additions have been published in the Monthly Proceedings.

The collection of MSS. of the Society have also received valuable additions. There were 110 Sanskrit and 8 Persian MSS. purchased or copied. A separate list of the former is about to be issued. The old MSS. of the Society have again been revised, and such MSS. as were wholly or partly damaged, from the corrosive effects of bad ink used in their transcription, have been replaced by new copies.

The Catalogue of the Sanserit MSS. mentioned in last year's report has made considerable progress.

The Photographic Album of the Society has received several excellent additions from the Government of India, especially the large set of photographs of Bihár antiquities detailed in December's Proceedings.

The inadequate space now available for the library, has during last year also prevented the new Library Catalogue. from being completed. The Council regret the continuance of this evil, and will endeavour, on the removal of the Natural History collections, to place at an early opportunity a revised edition of the Catalogue in the hands of the members.

#### Coin Cabinet.

There have been several additions of minor importance to the Society's collection of coins. No expenditure was incurred in buying coins, the addition being entirely donations from members, viz., 3 Nepál coins from Rev. C. H. Dall; 2 silver and 6 copper coins dug up at Kanauj from M. L. Ferrar, Esq., C. S.; a large round gold coin from Colonel T. C. Hamilton; 5 silver coins from Dr. Newman.

#### Journal.

There were issued, in 1871, twelve numbers of the Society's Proceedings, 342 pages, with four plates, giving an excellent summary of the labours of the Society. The Meteorological Observations, which were formerly issued quarterly with the fasciculi of Part II. of the Journal, have been transferred to the Proceedings; 98 pages were issued during last year.

Of Part I of the Journal two numbers have appeared, the third with several plates and index is about to be issued. The three numbers will contain nearly 800 pages. Of Part II, four numbers with index have been issued, the whole containing 489 pages and 28 plates. The numbers of the second part were issued quarterly. Contributions to Part I are, from the nature of the subject matter, less easily obtainable, and the issue of the numbers cannot always be satisfactorily regulated.

The Council are confident that, in point of interest and variety of subjects, the volume for 1871, extending as it does over 1,200 pages, will take its place among the best issued by the Society. The plates have greatly improved. The value of the contributions; issued as they are in two distinct volumes, is best attested by the numerous applications for extra numbers, the sale of which during 1871 amounted to Rs. 1,730.

The Council have also resolved to issue the next volume in a slightly enlarged form, and have made arrangements with the printers for a new fount of types, which it is hoped will meet the wishes of the members.

#### Bibliotheca Indica.

The series was first started in 1848, and from that date to the close of the last year no less than 472 fasciculi, comprising portions of 86 oriental works of great importance, have been published. The original scheme contemplated the publication of texts accompanied with English translations, under the superintendence of a single editor. This was, however, found impracticable, as the restrictions operated unfavourably, and translations could

not be got up with sufficient rapidity. It was felt also that in many cases years must be spent before a perfectly satisfactory translation could be finished. Accordingly in 1851, it was resolved, that " whilst it was of the highest importance that translations should be made in India, it was not expedient to limit the publication of volumes in the *Bibliotheca Indica* to works which the editor may be prepared at once to translate." The principle of getting works of various kinds printed under the editorship of one person, was likewise abandoned; and oriental scholars, both in and out of India, were invited to contribute to the series. These changes were attended by the most satisfactory results. The invitation of the Society was readily responded to, and several gentlemen of distinguished oriental acquirements undertook to edit works to which they had paid particular attention, and were especially fitted to do them justice.

Of the 86 works which have been undertaken from time to time, 61 are Sanskrit, 10 Arabic, 14 Persian, and 1 Pali; eighteen of these being translations into English. Sixty-four of these have already been completed; and twenty-two are in progress. They have been selected, in most instances, at the recommendation of distinguished European orientalists, such as Professors Max Müller, Weber, Kuhn, and others; and careful attention has been paid in every instance to secure old and the most approved MSS. for collation, so as to render the publications of the Society in every way worthy of the patronage of the Government under which they are issued, and indispensable appendages to every oriental library of any pretension.

That the works have been, generally speaking, carefully edited, the Council have every reason to be satisfied; the names of the editors employed, it is believed, will afford ample guarantee on that point. Among them the Council have great pleasure in noticing particularly those of the late Drs. Roer and Ballantyne, Professor Von Kremer of Alexandria, Drs. Sprenger and Hall, Professor Cowell, Col. Lees, Mr. Blochmann, Professor Mahes'achandra Nyáyaratna, and Bábu Rájendralála Mitra, as the services they have rendered to the series, entitle them to the most cordial acknowledgments of the Society.

The late Hon'ble Court of Directors, when sanctioning the oriental grant, drew the attention of the Society particularly to the Vedas, as they constitute the most ancient religious records of the Hindus; and the Council are glad to notice that of the different works that have been published, or are now in course of publication, twenty-two are portions of those scriptures. When the series was first started, the *Saṁhitā* of the *Ṛig Veda* was selected as the oldest and most important among them; but after the publication of four fasciculi, information was received that Drs. Wilson and Max Müller were engaged in bringing out a complete edition of that work, together with a translation, under the auspices of the Court of Directors, and it became necessary to discontinue the Calcutta edition. The *Black Yajur Veda* was, thereupon,

selected, and no less than fifty-eight fasciculi of it have already been published.

The Sañhitá portion of that work was undertaken by Dr. Rœr, but, owing to his departure from India on the completion of the first volume, it had to be made over to Professor Cowell, who completed the second volume. The third has just been brought to a conclusion by Professor Mahes'achandra Nyáyaratna. The Council have every reason to be satisfied that the work is being carried on with great care and diligence.

The Bráhmaṇa portion of the work, including the Aranyaka, was made over to Bábu Rájendralála Mitra; and he has already published 34 fasciculi, and two more will, it is expected, complete his labours. The work comprises the most ancient liturgy of the Hindús, and is in importance second to none in the whole range of Sanskrit literature.

Of the third, or the Sáma Veda, the text and translation of the *Archika* had been published in Europe, and the Society therefore selected the *Tindya Bráhmaṇa*, which is the largest and most comprehensive of the Bráhmaṇas of that Veda. Sixteen fasciculi of this work have been issued, and only four remain to complete it. A complete edition of the Sañhitás with the commentary of Sáyaṇa and the musical notes of the text, has likewise been undertaken, and the three fasciculi which have been issued reflect much credit on the learned editor, Paṇḍit Satyavrata Sámas'ramí.

The Sañhitá of the fourth Veda having been published in Europe, the Society, in 1869, took in hand, at the suggestion of Professor Kuhn and Mr. Whitley Stokes, the only Bráhmaṇa extant of that Veda.\* Although no commentary was accessible, the editor, Paṇḍit Harachandra Vidyábhu-shana, had several old and excellent MSS., and it was expected that, with their aid and his own thorough knowledge of the subject, he would be able to do full justice to the work. Unfortunately his death, which took place immediately after the publication of the first fasciculus, for a time put a stop to the progress of this publication; but its printing has lately been resumed under the editorship of Bábu Rájendralála Mitra.

Of the Upanishads, or the theological portions of the Vedas, fifteen of the most important treatises have already been published. English translations of ten of them by Dr. Rœr, of two others by Professor Cowell, and of another by Bábu Rájendralála Mitra, have likewise been issued; and the Council have the pleasure to announce that most of the works are already out of print.

Next to the Vedas, the Vedáṅgas, or the sciences subsidiary to them, claim the greatest attention. These include phonology, grammar, prosody, glossary, rituals, and astronomy; the most important being the rituals or Sútras. They form a sort of exegesis of the rituals of the Vedas, and it is impossible to understand the purport of the Vedic mantras, and the most

\* Gopatha Bráhmaṇa.

ancient laws, customs and domestic rites of the Hindus without a careful study of those works; and the attention of the Philological Committee was, therefore, early directed to collect materials for their publication. The difficulty of obtaining old and correct MSS., has, however, prevented them from undertaking more than four works\* of that class, two of which have been completed.

On the Vedic Prosody the leading work is the Chhandas Sūtra of Piṅgala; and of this, one fasciculus has lately been published, and the concluding portion is in a forward state.

Each Veda has its own separate system of phonology, or Prātisākhya, and the Society, in 1854, resolved to print the treatise of that class which bore upon the Black Yajur Veda. The task was confided to Bābu Rājendra-lāla Mitra who had undertaken to edit the Brāhmaṇa of that Veda; but the Brāhmaṇa itself having completely engrossed his leisure for many years, it could not be taken in hand until two years ago, when Mr. Whitney had published the first ten chapters of the work together with an English translation, in the Journal of the American Oriental Society. The bulk of that edition, however, being printed in the Roman character and its being otherwise imperfect, as the examples are generally omitted, or mutilated, the necessity for a complete edition in the Devanāgarī character was not superseded, and the Council, therefore, did not think it proper to put a stop to the Society's edition. To the whole body of Indian readers, a large and daily increasing class, romanised editions of Sanskrit works are useless, and it is believed that the Society's edition will be most welcome to many to whom the American edition will never be accessible.

Of the six leading philosophical schools of the Hindus, the original text books of five have been published. The *Sūṅkhya* is represented by the Aphorisms of Kapila with an English translation, published by the late Dr. Ballantyne; the *Vedānta*, by a complete edition of the Sūtras of Vyāsa with the commentry of S'aṅkara and the gloss of Anandagiri; the *Nyāya*, by the Aphorisms of Gotama with the commentary of Vātsīyana; the *Tais'eshika*, by the Aphorisms of Kanāda with the commentary of S'aṅkara Miśra; and the *Mīmāṃsā*, by the Aphorisms of Jaimini with the commentary of S'āvara Svāmī. The text of the sixth school, the *Yoga*, has been carefully collated, and a few pages have already been printed. On the completion of this work, the texts of all the six schools will be rendered easily accessible to scholars.

The peculiar form of the *Vedānta* doctrine which rejects the gnostic theory that knowledge is the one thing needful, and contends that knowledge is only

\* Ks'valāyana S'ranta Sūtra (completed.)

Ditto Grihya do. (do.)

Lātyāyana Kalpa Sūtra.

Gobhiliya Grihya Sūtra.

the handmaid of faith, *i. e.*, the doctrine of *Bhaktimārga*, is represented by two works, the Aphorisms of S'āṇḍilya, edited by Dr. Ballantyne, and the *Chaitanya Chandrodaya Nāṭaka*, edited by Bābu Rājendralāla Mitra.

On the minor systems of philosophy two works have been published, the polemical disquisitions of S'aṅkara, the *S'aṅkaradigvijaya*, and the summary of Mādhavāchārya, the *Sarvadarsana Saṅgraha*.

Next to the Vedas and the Darsanas, the most important branch of Sanskrit literature is represented by the Purāṇas. They form a distinct class, and have of late entirely superseded the religion of the Vedas. The attention of the Philological Committee was early turned to them, and three works were undertaken at different times, two of them the *Mārkaṇḍeya Purāṇa* and the *Nāradapañcharatra*, edited by the Rev. K. M. Baurerji, have been completed, and a third, the *Agni Purāṇa*, is now in course of publication.

No work on Hindu law (Smṛiti) was undertaken until last year, when the digest of Hemādri, King of Deogarh, the *Chaturvarga Chintāmaṇi*, probably the work of the grammarian Vopadeva, was brought to notice. The parts, however, which have been published of it refer to *dāna* or gift, which are not likely to interest European readers so much as those relating to judicature and inheritance. It is expected, however, that the other parts will soon be sent to press.

The most important branch of Hindu science is astronomy, and on that subject three works have been published in the Bibliotheca Indica. These are the *Vrihat Saṅhita* of Varāha Mihira, the *Surya Siddhānta*, and the *Siddhānta S'iromaṇi* of Bhāskara Achārya. English translations of the last two by Bāpu Deva S'āstri were edited by the late Venerable Archdeacon Pratt. They were eagerly sought by scholars, and are now out of print.

Of Sanskrit Rhetoric, the series includes the *Dasarūpa*, edited by Dr. Hall, the *Kāvyādarsa* of Daṇḍin, edited by the late Professor Premachānd Vidyāvāgis'ā, and the *Sāhitya Darpaṇa*, edited by Dr. Rōer. A translation of the last was undertaken by the late Dr. Ballantyne, and on his departure from India, taken up by Bābu Pramadādāsa Mitra. One fasciculus remains to be printed to complete this work.

Allusion may likewise be made here to the Society's editions of the life of Sākya,\* the political maxims of Chānakya, the minister of Chandragupta, compiled by his disciple Kāmandaki,† the *Vāsavadattā*,‡ which is reckoned to be the best prose romance in the Sanskrit language, and the second part of the great epic of Śrīhars'a, the *Naishada*,—all standard works of the different classes to which they belong, without a knowledge of which no oriental

\* Lalita Vistara. Edited by Bābu Rājendralāla Mitra.

† Kāmandakiya Nitiśāra, by do.

‡ Edited by Dr. Fitz-Edward Hall.

scholar can come to an understanding of the nature and character of the Hindu classics, or deduce a history of the manners, customs, and the social and religious life of ancient India.

It is not to be expected that ancient Sanskrit texts, whether accompanied by translations or not, will meet with any extensive sale; the Council have nevertheless the satisfaction to notice that sixteen out of the forty-five works completed, are out of print, and fresh editions are in demand.

Turning from the Sanskrit to the Persian series of the Bibliotheca, it will be found that the works published in it are in some respects even more important than the former. They embrace a large body of the most authentic chronicles accessible regarding the rise and progress of the Muhammadan power in India—the works of contemporary writers—which cannot fail to afford most valuable materials for a correct and detailed history of this country for over six hundred years. One of the works was prepared for the press by the late Mr. Morley of London, and the others have been printed by Maulavi Sayyid Ahmad of 'Aligarh, several Maulavis of the Calcutta Madrasah under the superintendence of Col. Lees, and by Mr. Blochmann.

Among the works now on hand, the new edition of the *Ain i Akbari* and its translation deserve especial mention.

An impression seems to be abroad that the bulk of the oriental grant is devoted to the publication of Sanskrit works, and adequate encouragement is not held out to Semitic literature. This, however, the Council are glad to observe, is not the case. Since 1851, 233 fasciuli of Sanskrit works have been published at a cost of Rs. 78,000, and 191 fasciuli of Persian and Arabic works at Rs. 67,000, shewing a difference of only 11,000 Rs. in favour of Sanskrit. This is, however, accounted for by the special grant of Rs. 3,000 per annum sanctioned for Sanskrit works since the middle of 1868.

The total sum devoted to the printing and publication of translations amounts to Rs. 7,625, of which a little over 3000 Rs. are due to translations from the Persian and Arabic.

The publications of the past year include twenty-seven fasciuli, viz. 8 Persian, 1 Arabic, 17 Sanskrit, and 1 English translation from the Persian.

In the Persian series, Mr. Blochmann has issued one fasciculus of the text of the *Ain i Akbari* (XIII), and one of its translation; Maulavi Agha Ahmad 'Ali has brought out parts III, IV and V of the *Ma'asir i 'Alamgiri*, and Maulavi Zulfakar 'Ali, four fasciuli of the *Fahang i Rashidi* (II—V).

Arabic is represented by the tenth part of Vol. IV of the Biographical Dictionary of Persons who knew Muhammad, edited by Maulavi 'Abdul Hai.

The following are the names of the Sanskrit works issued during the year—

Tandya Mahabrahmana, with the commentary of Sayana Acharya,



edited by Anandachandra Vedāntavāgīśa, Nos. 219, 221, 225, fasc. XIV, XV, and XVI.

The Taittiriya Aranyaka of the Black Yajur Veda, with the commentary of Sāyana Acharya, edited by Rājendralāla Mitra, No. 226, Fasc. X.

The Mimāṃsā Darsana, with the commentary of S'āvara Svāmī, edited by Paṇḍit Mahes'achandra Nyāyaratna, No. 240, Fasc. XI.

The Nrisiṅha Tāpanī, with the commentary of S'aūkara Acharaya, edited by Rāmamaya Tarkaratna; Nos. 223, 238, Fasc. II and III.

The Sūma Veda Saūhitā with the commentary of Sāyana Acharya, edited by Satyavrata Sāmas'ramī; Nos. 218, 224, 235, Fasc. I—III.

The Chaturvarga-chintāmaṇi by Hemādri, edited by Professor Bharatachandra S'iromani; Nos. 229, 237, 242, Fasc. I—III.

The Gobhiliya Gṛhya Sūtra with a commentary by the Editor, edited by Paṇḍit Chandrakānta Tarkālankāra; Nos. 22, and 241, Fasc. I and II.

The Chhandas Sūtra of Piṅgala Acharya, with the commentary of Haliyudha, edited by Paṇḍit Vis'vanātha S'āstrī, No. 230, Fasc. I.

The Taittiriya Prātisākhya, with the commentary entitled the Tribhāshyaratna, edited by Bābu Rājendralāla Mitra, No. 234, Fasc. I.

#### Conservation of Sanskrit MSS.

A full report on the operations of Bābu Rājendralāla Mitra for the collection of information regarding Sanskrit MSS. in private libraries, has been published in the Proceedings for December last. The enquiry has hitherto proved successful; lists of a great number of little known MSS. have been collected, and these are being arranged and translated for publication.

The plan originally adopted for the printing of the materials so collected did not meet with the approval of Government, and the correspondence which thereupon ensued, caused considerable delay in the publication of the 'Notices' compiled by the Bābu. The first volume has, however, been completed, with a classified appendix as suggested by Government, and the first part of volume II, is now ready for issue.

#### Officers.

The duties of the Secretary have, as in the previous year, been carried on by Dr. F. Stoliczka and Mr. H. Blochmann, who jointly edited the Proceedings and the Journal.

Col. H. Hyde performed the duties of Financial Secretary and Treasurer till August last, when, on his departure for England, Col. J. F. Tennant succeeded him.

The Council have much pleasure to record their satisfaction with the good services of the Assistant Secretary, Bābu Pratāpachandra Ghosha, B. A.; they also favourably report on the work done by Babu Manilal Baisak, Assistant Librarian, Sayyid Waliullah, Storekeeper, and Buddinath Baisak, Cashier.

List of Societies and other Institutions with which exchanges of publications have been made during 1871.

Batavia :—Société des Sciences des Inderlandes.

Berlin :—Royal Academy.

Bombay :—Royal Asiatic Society.

Boston :—Natural History Society.

Bordeaux :—Bordeaux Academy.

Buenos Ayres :—Public Museum.

Bruxelles :—Académie Royale des Sciences, &c., de Belgique.

Cherbourg :—Société Impériale des Sciences Naturelles.

Calcutta :—Agricultural and Horticultural Society of India.

——— :—Tattvavodhini Sabhá.

——— :—Geological Survey of India.

Christiania :—University.

Dacca :—Dacca News and Planters' Journal.

Dera :—Great Trigonometrical Survey.

Dublin :—Royal Irish Academy.

——— :—Natural History Society.

Edinburgh :—Royal Society.

Lahore :—Agricultural Society of the Panjab.

Leipzig :—Deutsche Morgenländische Gesellschaft.

Liège :—Société Royale des Sciences.

London :—Royal Society.

——— :—Royal Asiatic Society of Great Britain and Ireland.

——— :—Royal Institution.

——— :—Royal Geographical Society.

——— :—Museum of Practical Geology.

——— :—Zoological Society.

——— :—Statistical Society.

——— :—Geological Society.

——— :—Linnean Society.

——— :—Athenæum.

——— :—Anthropological Society.

——— :—Nature.

——— :—Royal Astronomical Society.

Lyon :—Agricultural Society.

Moscow :—Société des Naturalistes.

Munich :—Royal Academy.

Madras :—Government Central Museum.

Manchester :—Literary and Philosophical Society.

New York :—Commissioners of the Department of Agriculture.

Netherlands :—Royal Society.

Paris :—Ethnographical Society.

—— :—Geographical Society.

—— :—Asiatic Society.

St. Petersburg :—Imperial Academy of Sciences.

Stockholm :—Royal Academy of Sciences.

Vienna :—Imperial Academy of Science.

—— :—Anthropological Society.

—— :—Zoological and Botanical Society.

—— :—Imperial Geological Institute.

Washington :—Smithsonian Institution.

On the motion of the President, the Report was unanimously adopted.

The scrutineers then announced the elections of Officers and Members of Council for 1872, as follows :—

T. Oldham, Esq., L. L. D.,

*President.*

The Hon'ble J. B. Phear.

Bábú Rájendralála Mitra.

*Vice-Presidents.*

E. C. Bayley, Esq., C. S., C. S. I.

Dr. F. Stoliczka.

H. Blochmann, Esq., M. A.

*Secretaries and Treasurer.*

Col. J. F. Tennant, R. E.

Bábú Rájendralála Mitra.

The Hon'ble J. B. Phear.

T. Oldham, Esq., L. L. D.

Dr. F. Stoliczka.

H. Blochmann, Esq., M. A.

Col. H. L. Thuillier, R. A., C. S. I.

Col. J. F. Tennant, R. E.

Dr. G. King.

*Members of Council.*

E. C. Bayley, Esq., C. S., C. S. I.

Rájá Jotindramohan Tagore, Báhádur.

W. L. Heeley, Esq., B. A., C. S.

L. Schwendler, Esq.

Col. J. E. Gastrell.

J. Wood-Mason, Esq.

Col. A. S. Allan.

Mr. D. Waldie proposed that the thanks of the Society are due to the Secretaries and Treasurer for the marked zeal with which they have carried on their onerous duties during past year. Carried unanimously.

The following gentlemen were elected to audit the accounts of the Society for 1871—Messrs. D. Waldie, F. W. Peterson.

The retiring President then read the following address.

## PRESIDENT'S ADDRESS.

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During the past twelve months my official duties outside the Society, have been of an unusually pressing nature, and have left me little or no time at my own disposal. The leisure, too, which I had expected to find in the autumn vacation of the High Court, I was deprived of by illness. For these reasons I am now, I regret to say, totally unprepared to make to you such an address, as should be in any degree worthy of the occasion. I venture, therefore, to ask your indulgence, and to beg that you will, on the grounds I have mentioned, hold me excused of that apparent inattention on my part to the last function of a retiring President, which the meagreness of my present communication to you, if unexplained, would naturally seem to indicate.

You will find all the material details of the administration of the Society's affairs during 1871 in the Report of the Council, and I do not know that there is any particular therein to which I need call your especial attention. Accidental circumstances caused the amount of subscriptions collected within the year to be less than it might have been; and to this extent the apparent income of the Society has been diminished. But a portion of the subscription thus outstanding has, I believe, already been collected in the current year, and I trust that more will be so. In spite of serious losses by death and resignation, the total number of the members of the Society has increased from 414 to 446; although, I am sorry to say, the number of resident members as compared with that of last year, has considerably diminished; and I am afraid we must expect it still to diminish as long as our accommodation is so straitened as it now is. The Honorary Secretaries, Dr. Stoliezka, Mr. Blochmann, and Col. Tennant, and also the Assistant Secretary, Babu Pratápa Chunder Ghose, have zealously worked in the interests of the Society, and deserve your best thanks for their services.

We are bound also to especially thank Babu Rajendralála Mitra, Mr. Blochmann, and the several pundits and maulawis, who have devoted much valuable time and labour to the important work of the Society's Oriental publications. With regard to the quality and quantity of the work so done, inasmuch as it has been impeached elsewhere, I shall say a few words presently.

Unfortunately the endeavours of the officers of the Society to promote its interests, and to enlarge the scope of its activity are gravely hindered, so long as the obligations towards us which Act XVII of 1866 imposed upon the Government of India, remain unfulfilled. At our last anniversary meeting, as you will probably remember, I remarked upon the attitude relative to the Society, which the Government presented in this matter, and the situation of

embarrassment and difficulty, in which the Society was consequently placed. I will not again dwell upon this very disagreeable topic. The lapse of another year has furnished me with almost nothing to communicate to you in respect of it; but nevertheless, I hope I am not over-sanguine in thinking that I have lately seen *indicia* of a disposition in the Government to recognize its responsibilities to our Society. And, indeed, I feel convinced that the Governor-General in Council needs only to become really acquainted with the nature of the Society's claim, to perceive the justice of affording the relief which we ask.

We have had the misfortune this year to lose by death several of our most eminent and valuable members.

The tragic event which deprived us of Mr. Justice Norman will ever be remembered with sadness by us all. He had in almost an unexampled degree endeared himself to every one by his kindly disposition, by his frank and genial bearing. But it was to his intimate personal friends that the sterling worth of the man stood revealed in its fulness. I knew him too well to trust myself to dwell upon this theme, and there are those now present, I am sure, who will feel with me that silence with regard to it, may be a more eloquent tribute *in memoriam* than the best chosen words. Mr. Norman was elected a member of our Society in 1863; and had a seat in the Council in 1868, and following years. In 1866 he was appointed by the Governor-General in Council one of the trustees of the Indian Museum. His attainments in the department of natural science, and in particular his knowledge of botany, were considerable; and he was always a zealous supporter of our Society.

Archdeacon Pratt, whose sudden and melancholy death occurred almost at the very close of the year under review, took his degree at Cambridge in 1833, when he obtained the high place of third Wrangler in the Mathematical Tripos. It is remarkable that his College, Caius, one of the smaller Colleges of the University, also produced the senior wrangler of the year, namely, Ellice, a man of conspicuous ability, whose career of distinction was unfortunately cut short by death at an early age. Bowstead, Kemplay, Cartmell, Hildyard, now well known names, were among the leading men of the tripos. Mr. Pratt became Fellow of his College, and for a time resided in the University. He wrote the text book, which was for many years afterwards very familiar to all competitors for Mathematical honors, under the name of 'Pratt's Mechanical Philosophy.' Although this book was in its best parts a translation and contained little, if any, strictly original matter, its appearance in fact marked an era in the course of mathematical teaching and study at Cambridge, because it was in a great measure the means of introducing there the methods, and the lucid reasoning of the French philosophers. A very few years subsequently, the works of the French writers themselves came to be resorted to in the original as text-books by the higher class of students. Mr. Pratt commenced his service in India so long ago as 1838; and fortunately

the leisure afforded by the clerical profession, enabled him to keep up his mathematical pursuits. The Archdeacon lately told me that he had never devoted himself to observing natural phenomena. He was, however, always ready to take the facts furnished by others; and to deduce from them by the principles of applied mathematics, their legitimate physical consequences. In this direction, his labours were of immense assistance to the practical investigator and of great value to the cause of science. He was the author of as many as nine or ten important papers in applied mathematics, which were from time to time published in our Journal; and I believe he was also a constant contributor to the Philosophical Transactions. I may add that the Archdeacon was member of our Council in 1842 and the two following years, and was also constantly a member of our Committees.

By the deaths of Sir J. F. W. Herschel, and Col. Sir P. T. Cautley, two very distinguished names have gone from our list of honorary members.

The Report of the Council on the Oriental publications will give you an account of the works published by the Society in the Bibliotheca Indica, not only during the past year, but to some extent since the commencement of the series in 1848. I do not propose, and I am not competent, to offer a critical discussion of these. They appear to me to afford substantial proof that the Society is not idle or remiss in the discharge of the public duty, which the reception of the Government grant makes incumbent on it. I am, however, induced to say a very few words on this point, because in a late number of the Contemporary Review (that of September last) the eminent scholar, Max Müller, while praising, no doubt most justly, the labours of his countrymen, Drs. Bühler, and Kielhorn at Bombay, expressed himself in terms, which seem to me to imply an undeserved disparagement of the results produced by ourselves. The passage to which I refer runs as follows:—

“Equally important for the encouragement of native scholarship is the publication of the ‘Bombay Sanskrit Series,’ under the editorship of Drs. Bühler and Kielhorn. What distinguishes these editions of Sanskrit works from all others, is the attempt to edit each text according to the strictest rules of critical scholarship. Most of the Sanskrit texts which have been published in India, many also that have been published in Europe, are, like the *editiones principes* of Greek and Roman classics, mere reprints of one MS. If various readings of other MSS. were given, they were given at random, without any previous classification of MSS.; and in many cases the editors themselves, not understanding the text as they found it, have altered the original wording and spoiled it. Drs. Bühler and Kielhorn, as well as their native colleagues, have honestly endeavoured to restore a text that is founded on the authority of those MSS. which, after a careful examination, had proved to be the most authentic, and they have persistently abstained from introducing conjectural readings. We hope that their example will be followed, and that we shall have no more of those so-called eclectic editions which have brought so much discredit on Sanskrit scholarship. The only thing which we regret is, that the number of texts published in the Bombay Series should be so limited. If this should be owing to a

want of funds, it would seem very desirable that the larger sum of money annually granted to the Asiatic Society of Calcutta for the publication of Sanskrit texts, should in future be divided between Calcutta and Bombay. Valuable as the volumes of the *Bibliotheca Indica* are, the scholars of Calcutta might do well to combine their forces with their colleagues at Bombay, and to agree with them in a common line of action. Some of the Calcutta texts are not edited as they ought to be, and since the departure of Professor Cowell from Calcutta there seems a want of supervision in the management of this important undertaking."

It certainly appears to be true that the number of texts published in the Bombay series is limited; for, as far as I can make out, they amount only to six within the last six years. And this shortcoming may be due to want of funds; but I fail to see the reason which makes it therefore "desirable that the larger sum of money annually granted to the Asiatic Society of Calcutta should in future be divided between Calcutta and Bombay." If we look at the nature of the Bombay texts, we find that four out of the six are school books, of each of which there were several editions extant (in two cases even so many as 30 and 60 respectively) before the Bombay editors took them up. According to the rule, which we consider ourselves bound to follow in the disbursement of the money granted by the Government, texts situated as these are would not be chosen by us for publication at the public expense, but would be left entirely to private enterprise. As long as precious and important oriental works remain in MS. only, and for that cause are not only inaccessible to scholars generally, but are also under risk of becoming totally lost to the world, we direct our efforts at publishing these, in preference to putting forward new editions of works which are already in the hands of the public. We do not even, generally speaking, reprint any of our own *Bibliotheca Indica* series, the copies of which may have become exhausted. The remaining two texts of the Bombay series are the *Apastamba Sutra*, and *Paribāshendu-sekhara*, text and translation, the one presenting a little less than 100, the other a little more than 400 pages. I will assume on professor Max Müller's authority, and, indeed, I have no doubt, that these have been exceedingly well edited. But when I remind you, on the other side, of the Council's Report just read, from which it appears that we have since 1848 published no less than 472 fasciuli, giving portions of 86 very important oriental works, and that these run to something between 1700 and 2400 pages every year, I think you will be of opinion that our Bombay competitors have not beaten us either in quantity or character of published material. As to the concluding remark of Professor Max Müller in the passage which I have quoted, I deny altogether that the departure of Professor Cowell from Calcutta affected for the worse the supervision in the management of the *Bibliotheca Indica*. The principal editors, Babu Rajendralala Mitra and Mr. Blochmann are indefatigable in their attention to this important work. Nearly all the editors who laboured under Professor Cowell are still at their

posts, and new editors have been added to the staff, drawn from among the best scholars of Bengal. If any well considered comparison is to be made between the work turned out now, and that of the time of Professor Cowell, I feel pretty confident that the former will not be found faulty in the matter of editorial supervision. Professor Max Müller also states that "many scholars complain that they receive the numbers of the *Bibliotheca Indica*, very irregularly, and frequently in an imperfect state." I regret very much that I do not know the particular complaints to which the Professor alludes. Instances of irregularity in delivering numbers of the *Bibliotheca* on the part of our agents in Europe have at times in the course of years been brought to the notice of the Council; and I need hardly say that the Council has always, on such occasions, done all in its power to prevent a recurrence of the fault, if fault there was, by writing to our agents on the matter, and insisting on the necessity of the utmost care and diligence. I do not understand the accusation, that the numbers are *frequently* in an imperfect state. Once and once only, so far as I have been able to learn, a fasciculus was sent out wanting a sheet, obviously a book-binder's blunder; and considering that we issue upwards of 15,000 copies every year, I can hardly think that one mistake of this kind affords ground for convicting the editors of carelessness in supervision. Perhaps I ought here to explain one occurrence, which may possibly, by reason of misapprehension, have been looked upon by Professor Max Müller as a censurable irregularity in delivering the numbers of the *Bibliotheca Indica* to those entitled to receive them. It has been the habit of the Society to present its oriental publications to distinguished scholars among its Honorary Members. In 1868, the Council, thinking it undesirable to send both the Sanskrit and the Persian publications to each of such members, irrespective of the question whether he cared to receive them or not, passed a resolution to the effect that these Honorary members should be asked by letter to say what their wishes on the subject were. It was supposed that replies to this inquiry would be promptly received, and meanwhile the sending out the publications was stayed. Unfortunately, in some instances replies were very long in coming, and the Council at last, without further waiting, resumed the old practice. I believe that Professor Max Müller was one of those, whose copies were for a time stopped through this cause.

On the whole, then, I feel justified in hoping that the exertions of the Society in carrying on this great public work will be found not less worthy now than heretofore of the Society's high reputation.

Neither has our Society been sleeping over the cause of science. It must be remembered that in this country almost nothing can be hoped for, in the development of scientific knowledge and the prosecution of important scientific investigations, otherwise than through the aid and encouragement of Government. I may say that all the educated Europeans who reside in



India are either Government officials, or persons engaged in special pursuits. We have, here, no men of leisure and of independent means, excepting native gentlemen; and unfortunately among these, as yet, the spirit of scientific inquiry has scarcely, if at all, manifested itself. Under these circumstances, if the advancement of science were left to be effected by private organization and private enterprise, as is mainly the case in England, the results would be greatly smaller than they, even now, are. Those, however, to whose hands the Government of England's Indian possessions have been entrusted, have always to some extent understood their responsibility to the world at large in this matter. Mr. Markham's exceedingly interesting book gives an account, easy to be read, of the valuable work done by the officers of the various Indian Survey establishments. It is not my purpose, nor have I leisure, now to analyse or discuss the materials, which Mr. Markham thus pleasantly puts before us. At present, I refer to the book as affording ample evidence that the Government has always recognized the duty, under which it lies, to supply the means of working the special fields of scientific inquiry presented by India. Whether it has at all times set itself to perform this duty so zealously as it should, may be questioned. I am afraid, at any rate, that of late there has been some slackening of its earnestness. Last year, I at some length endeavoured to point out that, while the Government took upon itself the support of an establishment for the advancement of meteorological science, the results attained, or to be looked for from it, were very unsatisfactory, and the almost unrivalled opportunities of India in this department of science were almost lost, simply for want of system and well considered organization. It is notorious that little sympathy exists between Chancellors of the Exchequer and men of science: and possibly a Financial Member of Council is only an erratic form of Chancellor of Exchequer. The truth is that probably all Governments of the present day require to be constantly urged by a force from without, to perform the duty of promoting the advancement and practical application of scientific knowledge. M. Henri Sainte-Claire Deville, at the beginning of last year, in a remarkable paper laid before the Academy of Sciences pointed out that this was the case even in France, where there is a paid scientific organization. I venture to think that it especially lies within the province of our Society to stimulate the action of the Indian Government in these respects, and to furnish it with guiding advice. I therefore feel sure that you have learned with satisfaction, from our published Proceedings, of the proposal lately made by our Council to the Governor-General in Council for the undertaking of deep sea dredging in Indian waters. That proposal has been received very favourably, and I sincerely trust that the Government will not delay to give effect to it. I believe it is impossible to over-estimate the importance, in most branches of Natural Science, of the results which may reasonably be anticipated from the

proposed undertaking. As I said last year with especial reference to the department of meteorology, it will redound little to the credit of English rule on this side of the world, if with the staff of able scientific men at this time to be found in Calcutta, the immense natural advantages of this region are allowed to be neglected and unused. I hope the Government will not now stand still at its promise, leaving the fulfilment to wait upon accident. The suggested Committee should, at least, be constituted without delay, and immediate preparation made of that material and apparatus, which is indispensable to the expedition. It would be melancholy indeed if the event of a Queen's ship being reported available for this special service should by reason of absence of supply (that universal difficulty in English organizations) become infructuous.

While speaking of science as lying within the care of this Society, perhaps I may be allowed to express a doubt, whether our body does quite so much, as it well might, towards furthering the application of scientific knowledge to actual work. We all know that there are in progress in this country public undertakings of great magnitude, such, that often in the course of them, physical and mathematical problems of a high order, or of considerable complexity, fall to be solved. I desire not to do an injustice to the many able and skilled officers engaged in these undertakings; but I believe I do not err in thinking that comparatively speaking few among them are familiar with the higher principles of physical mathematics, or have any considerable command over the mathematical analysis, necessary for working out the results which would follow from the application of those principles in a given case. It will not now-a-days be said that the labours of the mathematician and physicist in the cabinet are valueless to the man, who has to observe the phenomena, and to deal with the forces, of nature in the field. In England the engineer constantly seeks the aid of the mathematician. And in France the prevailing belief is, that the recent successes of Germany are attributable solely to the persistency with which the Germans have of late years been availing themselves in all directions of the resources of science. It has occurred to me that our Society would do good service, if it afforded the means from time to time, of scientifically criticising the various works to which I have alluded, and of bringing to the test of mathematical analysis and physical reasoning the many important questions which arise in the course of carrying out those works, and which are suggested in, or form the subject of, professional reports. At present I may say that as a body we are altogether inactive in this direction. Our late member, the venerable Archdeacon Pratt, was ever ready to give the benefit of his mathematical powers and scientific knowledge, to those who sought it. But as a Society I believe we have done little or nothing of this kind. It seems to me that we should not leave such work solely to the accidental efforts of individual

members. We ought to have some permanent organization for the purpose of seeking it out, and performing it. And with this view, I should be disposed to say that in connection with our Natural Science Committee, a Sub-Committee should be formed, which should take upon itself the duty I have indicated, and in particular should make an annual report to the Society.

In Ethnology, the work of Colonel Dalton is in the course of being printed, at the expense of the Government of Bengal, under the superintendence of this Society. Indeed I may say that it is all but finished: it will probably be published in March, and cannot fail, I believe, to prove a most valuable contribution to science. We all know how intimate an acquaintance Colonel Dalton possesses with the various outlying races of Bengal, an acquaintance formed during long-continued service in what I may term frontier districts of this Presidency. His qualifications for the task, which he undertook, of compiling and editing the ethnological information to be gathered from many scattered official papers and other sources, were incontestibly of a high order, and if he had confined himself to this, the results of his labours would doubtless have been still valuable. But he has done much more: the bulk of his work is description, of a vivid and interesting character, drawn by his own pen, upon the foundation of personal observation.

Dr. Oldham and Mr. Blochmann, who kindly undertook on the part of the Society to superintend the printing of the book, have discharged that duty in a way to deserve your best thanks. The illustrations have been admirably executed; and would of themselves, even dislocated from the letter press, constitute an important publication in this department of natural science.

Dr. Anderson's 'Report on the Expedition to Western 'Yunan' very lately published, gives us a complete and clear account of the adventures of, and the geographical results effected by, Major Sladen's exploring party in 1868. A further report will follow, describing the results of Dr. Anderson's own labours as naturalist to the exhibition. This narrative forcibly impresses upon us the difficulty and danger of exploring (even under favourable circumstances) a very short distance beyond the limits, to which English authority extends in this part of the world. On first thoughts and in view of the great things which were accomplished by Marco Polo in the 13th century, and by the Jesuits in China in more modern times, it certainly does appear little creditable to our countrymen that at this day the tract of comparatively-speaking unknown land, which on the west, north and east lies between India and the rest of Asia should be, I may say, so enormous as it is. Dr. Anderson himself remarks—"It does not say much for geographical enterprize in the East, in recent times, that the Irawaddy, a river "equalling in magnitude the Ganges of India, should remain unexplored.

"This noble river flows for many hundred miles through British territory, "irrigating its fields, transmitting its merchandize through the country, and "leading up to the very doors of China; and yet no one has had the curiosity, courage or encouragement to search out from whence it comes." But a little reflection serves to give another aspect to the question. Amongst oriental peoples, we English are now suffering a penalty consequential to the greatness and proximity of our power: I can conceive nothing more natural than that the ruling classes (at the least), whatever may be the case with the population, of countries bordering on India should dread the sight of an English or European explorer, and be glad, almost by any means to keep his foot from their soil. This was not so formerly. The feeling of jealousy, and the determination to exclude, is probably even now deepening and extending, as the reputation of our strength and avidity for dominion spreads and radiates. Shaw's Tartary and Kashgar abounds with facts, which tend to support such a conclusion. The fate of a Schlagintweit and of a Hayward shows how relentless and unscrupulous is the hostility which these motives generate in our northern and eastern neighbours. The wonder, truly, is that, when to explore and observe means to carry your life in your hand, private efforts at geographical inquiry should be so persistent and successful as they are.

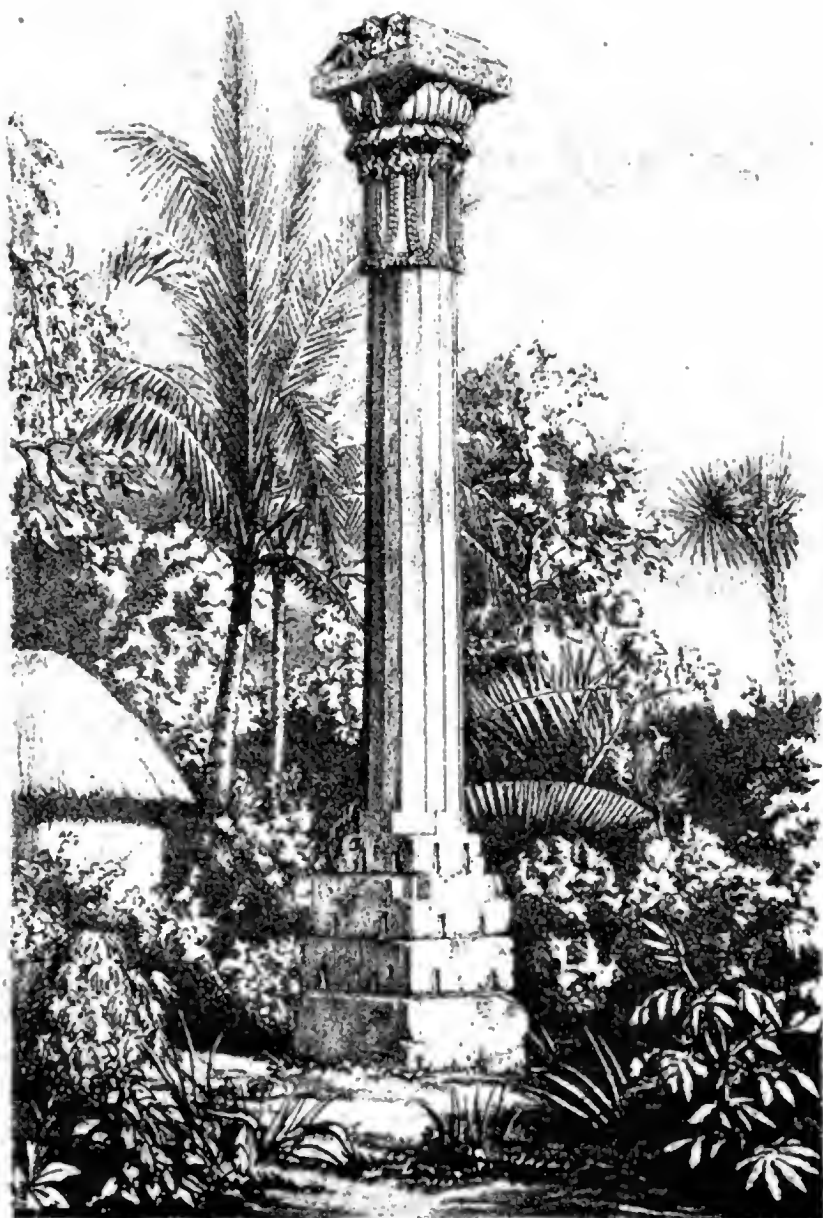
I desire, before I close this short address, to bring under your notice two expeditions which have recently been made to Orissa in furtherance of archæological inquiry. The first of these—a party of draughtsmen and moulders who had been especially trained for the work by Mr. H. H. Locke, Principal of the Government School of Art—went to Bhubaneswar in 1869, and there executed casts of the more remarkable of the mouldings and sculptured figures, which form the decoration of the exterior of the ancient temples. Babu Rajendralala Mitra accompanied this field party, and during the short time he was with them, selected subjects for their earlier operations. From Bhubaneswar he visited the neighbouring rock-cut-temples, or caves of Khandagiri, and you will doubtless remember that he not long ago gave us in this room some of the results of his observations. The second expedition—also a party of Mr. Locke's students, this time under his own personal superintendence—proceeded to Orissa in the end of December last, and has, I believe, hardly yet completed its labours. Mr. Locke's principal object on this second occasion, was to obtain casts and drawings of the best and most characteristic carvings in the Khandagiri caves. He, however, made use of an opportunity, which occurred to him, to go to Jajpur, and to procure some excellent photographs to be made by Mr. Heritage, of the celebrated monolithic figures, and column at that place.

I need not expatiate on the value of work, such as that effected by these two expeditions, to those who are engaged in archæological and histori-

cal investigations. It serves the double end of placing, so to speak, original materials within easy reach of every inquirer, and of taking evidence, as it were *de bene esse*, which otherwise might pass irrecoverably away. This risk of disappearance, to which I allude, is by no means imaginary, for Mr. Locke infers from a comparison of the sketch of Bhubaneswar given in Sterling's paper on Orissa, (published in the volume of our Transactions for 1825) with the present features of the ground, that as many as eight or ten or even more of the smaller temples have within, say, the last forty years, sunk into confused masses, or ill-defined jungle-covered mounds of ruins.

No one, I suppose, will doubt that the tale, which would be told by the archaic remains of Khandagiri and Bhubaneswar, if they could be rightly interpreted, would be historically most important. The Khandagiri caves bear ample indicia of a Buddhist origin. But I believe that the Principal of our School of Art considers there is also a Greek element plainly perceptible in the ornament; I do not now refer to the dress, worn by the booted figure of the Ráni's cave, which, notwithstanding its foreign appearance, Babu Rajendralála supposes to be indigenous to this country; I speak of the conventional ornament on the mouldings and friezes. And then, if we pass over to Bhubaneswar, we find ourselves in the presence of a type of Hindu art, which is at any rate in this sense archaic, namely, that the forms assumed by the temples were developed in the infancy of structural resource. The lofty prismoidal tower gradually rounded in at the top and surmounted by a lotus-shaped crown, is not at first sight I think pleasing to the eye; but it is easy to understand how it might have grown out of the exigencies under which the builder worked. Without the aid of cement, and in the absence of any knowledge of the arch, the horizontal section, which could be effectually covered over by overlapping slabs of stone would necessarily be small, and therefore it would be by height alone that the designer could give any imposing character to his building. At first, too, the sides of such a building would probably be left comparatively free of ornament; but assuredly the eye of the Hindu architect would not long tolerate plain surfaces; he would soon learn to break them with ribs, and enrich them with carving. At a later stage, we might anticipate that the ribs would develop into turrets, or minarets, until even the coherence of the whole structure might be endangered, by the separate individuality which the subordinate parts had acquired. Whether or not this has been the real course of development, I will not pretend to speculate. But certainly there are at Bhubaneswar specimens of states of building very like those I have imagined. Then, too, in those cases where the wealth of decorative ornament is extreme, and I may say at first sight bewildering from its copiousness, a close examination shows that, after all, the whole is little more than repetition on repetition of certain comparatively few forms, examples of each of which appear on almost every temple. One of the





*S. Sedgwick Lith.*

*Calcutta.*

THE "SABHA STAMBHA". • Monolith at Chandoswar, near Jaipur.

Total height 36.10—Shaft (monolith) 28.8

most common, I may observe by the way, is the lion on the prostrate elephant, which, after the event, may perhaps be viewed as affording an apt heraldic foretelling of the British raj! It is, I think, incontestable that much has yet to be learnt, not merely as the correlative of little being now known, but in the shape of actual contribution to history, by a careful discriminating study of these stately silent monuments of an age, which seems to have left few other records behind it. I venture then to repeat that Mr. Locke has done great public service by turning out the beautiful casts and drawings which are the results of these two expeditions; and I think the Government would do well if, having regard to his great abilities and special qualifications for this object, it enabled him systematically every year to carry out work of the like kind to that effected by these parties.

I will take this opportunity of remarking that a strange misapprehension of fact relative to the first of these Orissa expeditions is apparent in the last published report of the Royal Asiatic Society. Complaint is there made that the expedition was "as little fruitful of results as that fitted out from Bombay." The report proceeds, "They did, however, bring back some "casts of sculpture, a few photographs, and several copies of inscriptions, but "unfortunately neglected to take casts or photographs of the remarkable "sculptures in the Ganesha and Juleo caves at Udayagiri. These are "probably the oldest and most interesting in India, and their attention had "been previously specially directed to them. As in the case of the Bombay "expedition, none of the results of their labours have been sent home." In direct opposition to this statement, I do not hesitate to say that the expedition was in a high degree successful. A very considerable number of casts were taken of well-chosen subjects, and every one who has seen them must be convinced of their great merit. Government itself officially pronounced the expedition a great success. Not only is it not true that, "none of the results of their labours have been sent home," but the fact is, I believe, that at the very time, when the report was published, the whole of the casts were at the India Office, London. And finally, I have good ground for saying that the attention of any one connected with the expedition was never directed to the caves of Udayagiri.

I have placed on the table this evening one set of the photographs, taken at Jajpur, and I must leave them to speak for themselves. An official report upon the archaeological remains of Jajpur was made so lately as 1869 by Mr. G. Smeaton, and is published in the Supplement to the Calcutta Gazette, 4th August of that year. Mr. Smeaton's descriptions do not appear to be always quite accurate: you will perceive from the photograph, No. 3, (Plate I) that the shaft of the Chandeshur column or lath is certainly not fluted as he describes it. Neither is it bevelled off at the foot. Tradition says that the Mahomedan general, Kalapahar, endeavoured to overturn the column, but failed to do so; only



succeeding in pulling down the figure which originally stood at the top. And it is generally believed, (upon what authority I do not know) that the Goruda, which is the subject of the photograph, No. 4, (Plate II) was the figure so cast down. Mr. Smeaton lends himself to this view, and adds "that the base on which the figure (the Goruda) stands belongs to the monolith, there is this additional proof, that in the four corners of the platform, holes are drilled exactly as in the corners of the monolith, and its capital." But I think if you place the two photographs side by side, it will be evident to you that the base, or platform, on which the Goruda now stands, never could have been a part of or an addition to the existing capital of the column: it is itself a capital, with appropriate mouldings, not a copy of, though closely resembling, the capital of the column. It is even open to doubt whether the Goruda itself ever could have formed the termination of the lath, for the image appears to be too small to be capable of being seen with effect at the elevation of 37 feet, to which the lath rises. I ought to say that the Goruda is now in a small thakurbari, about one and a half mile distant from the column, under the care of brahmans who do not permit a European to enter the building: they, however, willingly afforded facilities for the photograph being taken from the outside; and this was ultimately effected through the expedient of illuminating the image by sunlight thrown upon it by a succession of mirrors.

The Santamadhub figure, represented in photograph No. 1 (Plate III) has never before been wholly exposed. Mr. Sterling makes no mention of it at all, and Mr. Smeaton says with regard to it, "the lower half, from the loins downwards, is buried under roots and logs." On clearing the ground close along the margin of the visible portion, for the purpose of photographing it, the coolies struck upon the remaining portion separated from the first by an interval. The clue thus obtained was immediately followed up by further excavation, until the whole figure was brought into view, as it is seen in the photograph. It lies broken, in two large pieces, within a plot of garden ground, at a distance of one and a half or two miles from any of the monoliths. There is now, apparently, no trace of old buildings close to it; and in truth, almost nothing is known about it. There seems to be nothing to connect it specially with the spot, where it now is, and for its better preservation it would be well if it were removed to the compound in which the other monoliths have been placed.

In the very hurried mention, which I have this evening made of some of the more recent manifestations of literary and scientific activity in this part of India, I have made no attempt to be comprehensive. Had I been bold enough to do so, I must have failed. Time has not permitted me to touch upon such valuable labours as those of our Meteorological Reporter, or of the officers of our Trigonometrical and Geological Surveys, or even to notice



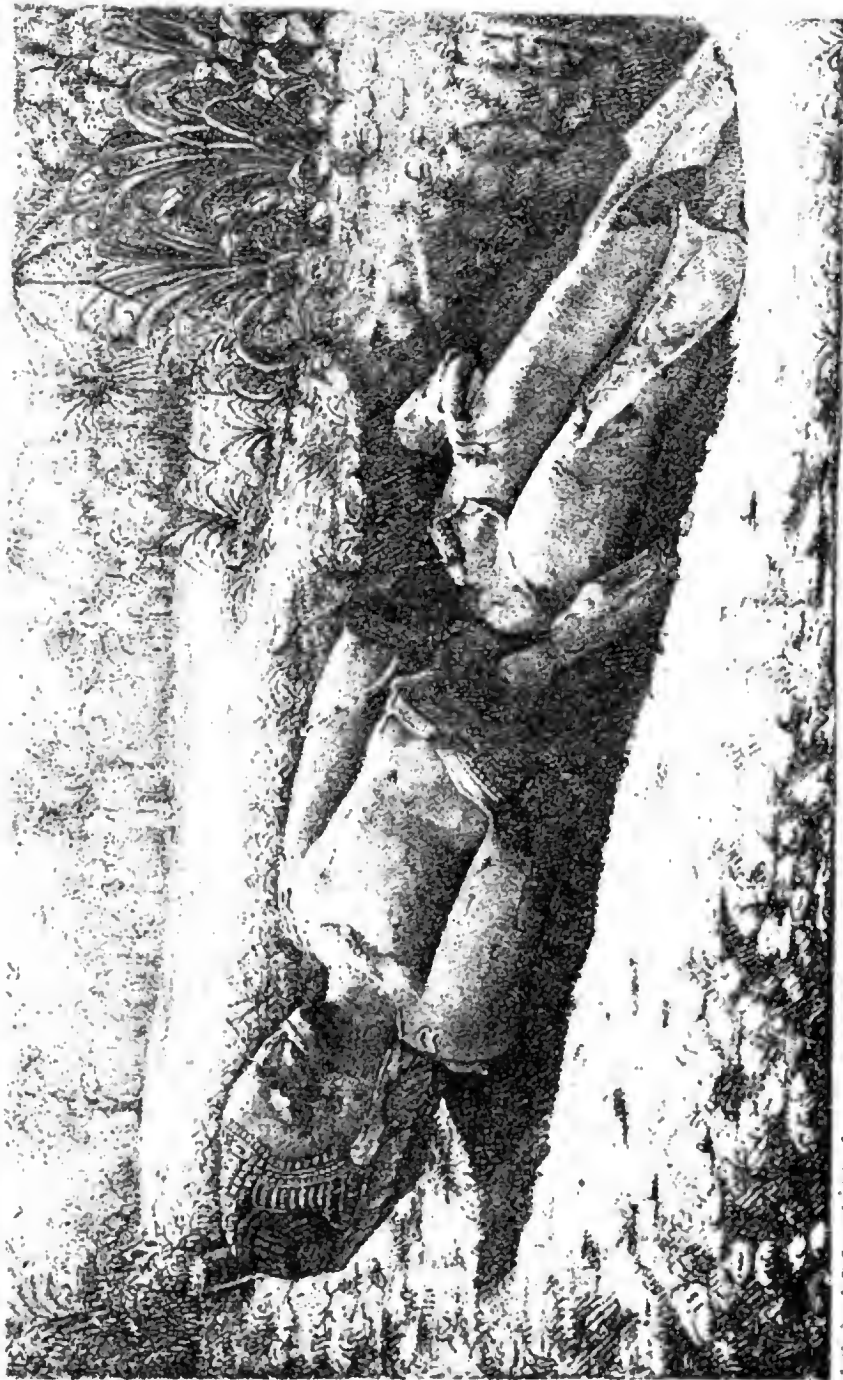
*Lith. by A.P. Bagchi, Student,*

FIGURE of GARUDA.

*Govt. School of Art.*

*Said to have been on the top of the Chandanwar Lath.*





COLOSSAL FIGURE AT SANTOMADHUB, (Shunt. Madhuba),  
Length of upper portion 8. 1 1/2 Length of Lower portion 6. 11.

Lith. by A. P. Dasgupta Student,

Govt. School of Art.



such excellent books as Westland's Jessore, and Oldham's Ghazipur ; of these latter, however, I must say by the way, that they are conspicuous examples of the good use, which may even yet be made by our local officers, of the advantages enjoyed by public servants in the Mofussil for observation and for the collection of historical materials. I trust, indeed I have reason to believe, that we shall ere long have more than one additional instance of the like assiduity and research.

Gentlemen, I now vacate the Chair in favour of the distinguished member of our Society, whom you have just elected to succeed me, and while doing so, I tender to our Honorary Secretaries and to all our other officers my sincere thanks for the courtesy and the assistance, which they have invariably rendered me during my term of office, and which alone has enabled me to discharge the Presidential duties consistently with the paramount claims of the public upon my time and attention elsewhere.

\*.\* Since the above address was delivered, I have seen the note of Lieut. Kittoe which is printed in Vol. 7, of the Asiatic Society's Journal, and the figures which accompany it. Apparently the existence of the Santamadhuh figure was not known at the time of Lieut. Kittoe's visit. J. B. P.

The Meeting then resolved itself into an ordinary Monthly Meeting.

The Hon'ble J. B. Phear, Vice-President, in the chair.

The minutes of the last meeting were read and confirmed.

The receipt of the following presentations was announced—

1. From the Government of India, Home Department, a copy of 'The Rock Temples of Elephanta or Ghárápuri,' by J. Burgess, F. R. G. S., with Photographic Illustrations, by D. H. Sykes.

2. From L'Académie Hongroise des Mines et Forêts de Schemnitz, through the Indian Government, A copy of 'Gedenkbuch zur hundert-jährigen Gründung der Königl. Ungarischen Berg-und Forst-Academie in Schemnitz, 1770-1870,' and a Bronze Medal struck in commemoration of the foundation of the Academy in 1770.

3. From Rev. J. Long, A framed Lithograph, representing the Races of Russia.

The following gentlemen, duly proposed and seconded at the last Meeting, were balloted for and elected Ordinary Members—

M. Sashagiri Sastri, B. A., Madras.

W. Minto, Esq., Assam.

Lieutenant-Colonel D. J. F. Newall, R. A., has intimated his desire to withdraw from the Society.

A list of Nicobarese words by Mr. Mann, received from the Department of Agriculture, was laid on the table.

Also, a Report on a New System of Transliteration, by J. G. Thompson, Esq., Judge, Berhampore, Ganjam.

The President then said that, at the Meeting of the Society held in November last, the Council, after due consideration, had proposed an alteration in Rule 29 of the Bye-laws. The rule as it stood at present was—"The Society shall meet on the first Wednesday in each month," for which the Council had recommended the substitution of the following—"The Society shall meet on the first Wednesday in each month, excepting in September and October." As alterations in the Bye-laws of the Society had to be referred to the whole body of Ordinary Members, voting papers had been sent to all non-resident Members. He would now appoint Messrs. D. Waldie and J. Wood-Mason to collect the votes of the members present, and act as scrutineers.

A discussion followed on the object of the proposed alteration, in which most members present joined. It was then announced by the scrutineers that there were forty-one votes in favor of, and four against, the proposed change, and the President declared the new rule passed.

The following letters were read:—

1. *From J. Delmerick, Esq., Rawal Pindi, regarding a unique Tetradrachma of a new Bactrian King.*

'I have the pleasure of submitting for the inspection of the Coin Committee of the Asiatic Society of Bengal a silver cast of an unique tetradrachma of a new Bactrian King. I have seen the original coin, but the owner, Chanda Mall, who is a professional coin seller, has such extravagant ideas of the nature of it, that I have been compelled very reluctantly to abandon all hopes of possessing it. The cast, however, will, I have no doubt, prove highly interesting to our numismatic friends.

'The coin was brought by an itinerant goldsmith of Sháh kí Dherí from Central Asia, and was sold by him a short time ago to its present owner for a mere trifle. I proceed to describe it.

#### COIN OF PLATO, THE ILLUSTRIOUS.

O. Æ. 15.—Tetradrachma. Weight of original coin 258 grains; weight of cast, 240 grains.

*Obverse.*—Helmeted head of King to the right, with the ends of the diadem hanging behind. The helmet has a long flowing crest, and is ornamented on the side with the ears and horns of a bull, like on some of the coins of Eukratides. The shoulders are draped. The whole is surrounded by a circle of astragarus beading.

*Reverse*.—Figure of King, erect, with long ends of diadem floating in the air, driving a Quadriga to the front. The horses in motion.

*Monogram*.—Thomas, No. 86; Cunningham, No. 89.

*Legend*.—In three-fourths of a circle at top, ΒΑΣΙΛΕΩΣ ΕΠΙΦΑΝΟΥΣ ΗΛΙΑΤΩΝΟΣ.

*Exergue*.—Three somewhat indistinct letters which are like ΜΟΣ.

‘When this coin was first placed in my hand, I mistook it for one of Straton, who also on some of his silver and copper coins takes the title ΕΠΙΦΑΝΟΥΣ, though, as far as I know, it never stands, as in this case, by itself, but is always followed by ΣΩΤΗΡΟΣ.

‘The monogram occurs frequently on the coins of Menander, and therefore it might be supposed that he existed immediately before or after that monarch who, according to Strabo, crossed the Hypanis and penetrated eastward as far as the *Isamus*; but the fact is that, for the present at least, or until we obtain one or more coins of King Plato with an Arian inscription, we must, I think, class him with the purely Greek Kings of Bactriana, such for instance as Diodotus and Euthydemus.’

2. *From E. C. Bayley, Esq., C. S. I., regarding a celt of extraordinary size and perfection.*

‘I send herewith a fine specimen of an Irish Celt found at Mount Leinster, County Wexford, and which has been lent to me by its owner, Colonel James, c. b., for exhibition at the meeting of the Society.’

3. *From M. L. Ferrar, Esq., C. S., Auck., further particulars regarding Rājāh Todar Mall.*

‘In continuation of my last letter about Rājāh Todar Mall, the following particulars derived from the ‘oldest inhabitant’ of Lāharpūr, may interest you.

‘Todar Mall’s father, Achal Mall was a K’hatri of the *Mehra* class: his mother, Syām Kooer of the Choperi class. The boy was born in 944 Hijri, and lived in Lāharpūr until his 12th year, when (955) he set off to Lāhor in search of employment, which he was successful in procuring under the Emperor Akbar.

‘Among the reforms which he effected was the fixing the *Faṣlī Era* for all land revenue arrangements: as also (as you mention in your *Aīn* translation) the adoption of the Fārsī instead of the Hindī language in such matters.

‘Close to Lāharpūr is a village, Rājāpūr, which he founded, his tank being still extant: the pueka steps were built by the hero. In another village, Daryāpūr, a *melā* is held every Jeyt (June) in his honour, at the shrine ‘Chhotā Bharāich.’



'Lāhūrpūr was originally Lāhūrpūr (لاهور پور), shortened into Lāhūrpūr, and now very commonly called still shorter Lahūrpūr. The name is spelled in the first manner in a sanad granted by Todar Mall himself to the ancestor of the present Qánúngo.

'Todar Mall's only son, Dhárú Mall, was slain in battle, and died without issue. And there are no descendants of the Rājah, on either side, extant in Lāhūrpūr.

'There can be no doubt whatever that the local belief is correct; for the man was not a mythical hero, but a veritable officer of King Akbar's. Strange that in a note to Elphinstone's History of India, fifth edition, page 510, he is said to have been a Káyath !'

Mr. Blochmann said—

Mr. Ferrar's first letter regarding Todar Mall, which was published in the Proceedings for September, 1871, (p. 178), has been read with some interest in Lāhor, and Maulawī Muhammad Husain of the Lāhor College lately wrote a note on this subject to Bábú Rājendralāla Mitra, of which I shall read a few extracts in translation.

1. The opinion generally received in Upper India is, that Todar Mall was a K'hatri of Lāhor. Elphinstone calls him a Káith; but the syllable *Mall* in Todar Mall's name renders this altogether impossible.

2. There is a Mahallah in Ágrah, where the funeral ceremonies (انہالہ) are held by all K'hatri's, and every one there knows that it was the Mahallah where Todar Mall used to live. In fact he had chosen his residence there, in order to be present at funeral, ceremonies of members of his caste.

3. Todar Mall's name often occurs in old popular songs in which he is invariably called a Tunan (ٹنن) K'hatri of Lāhor.

4. An old Bráhmaṇ of Lāhor says that one of his ancestors had been Purohit to Todar Mall. The Bráhmaṇ had often heard from his father that Todar Mall's father was a Tunan K'hatri of Lāhor; he had been a very poor man, and used to sell *g'hungní* in the streets. Once Akbar's *Mámú*\* had made a conspiracy to murder the Emperor, and Todar Mall's father had given information to Akbar's mother, to which fact Todar Mall owed his promotion.

5. The *Máúsirul Umará* clearly states that he was a Tunan K'hatri of Lāhor.† There are also several buildings in Lāhor and a tank, ascribed to Todar Mall.

Thus, it will be seen that the people of Lāhor are not willing to resign their claim on Todar Mall. On the other side, the fact that Todar Mall first served Akbar in Audh may be looked upon as supporting Mr. Ferrar's account.

\* This is a curious piece of information. The maternal uncle (*mámú*) alluded to is Khwájah Mu'azzam, who, for the murder of his wife, was executed by Akbar.

† The *Máúsir* merely calls him راجہ تودر مل کھتری لاهوری.

As the hour was late, the reading of the following papers was postponed till next Meeting—

1. *The Ruins at Kopari, Balasore District.*—By JOHN BEAMES, B. C. S.

2. *Translations from the Tārīkh i Fīrūzshāhī.*—By A. COLVIN, C. S.

3. *Introduction to the Santālī, Kol, Munda, Oráon, Rajmahallī Pahária, Korwa, and Birjea Languages.*—By DR. J. M. COATES, BERNAMPORE.

The receipt of the following communication was announced—

1. *Monograph of Himalayan, Assamese, Burmese and Cingalese Clausilia.*—By W. T. BLANFORD, F. G. S. C. M. Z. S.

2. *The Imperial Eagles of India.*—By W. E. BROOKS, C. E., ETAWAH.

The Meeting then broke up.

#### LIBRARY.

The following additions have been made to the Library since the Meeting held in January, 1872.

#### *Presentations.*

\*.\* Names of Donors in capitals.

Bulletin de la Société de Géographie, 1871, November.—SOCIÉTÉ DE LA GÉOGRAPHIE, PARIS.

Journal of the Chemical Society, August, September and October, 1871.—THE CHEMICAL SOCIETY OF LONDON.

The Quarterly Journal of the Geological Society, No. 108.—THE GEOLOGICAL SOCIETY OF LONDON.

Bijdragen tot de Taal landen Volkenkunde van Nederlandsch Indie, Vol. VI., 1e stuk.—VOLKENKUNDE VAN NEDERLANDSCH INDIE.

Bulletin de la Société Impériale des Naturalistes de Moscou, Tome X. to III., Nos. III et IV.—SOCIÉTÉ IMPÉRIALE DES NATURALISTES DE MOSCOU.

Nouveaux Mémoires de la Société Impériale des Naturalistes de Moscou Tome XIII., Livraison III.—SOCIÉTÉ IMPÉRIALE DES NATURALISTES DE MOSCOU.

Gedenkbuch zur Hundertjährigen Gründung der Königl. Ungarischen Bergund Forst Akademie in Schemnitz, 1770-1870.—L'ACADÉMIE HONGRAISE DES MINES ET FORÊTS DE SCHIENNITZ.

Bloemlezing uit Maleische Geschriften, Tweede stuk, door G. K. Niemann.—THE ROYAL INSTITUTE OF NETHERLANDS INDIA.

Recherches sur les Monnaies des Indigènes de L'Archipel Indien et de la Péninsule Malaie, par H. C. Millies.—THE ROYAL INSTITUTE OF NETHERLANDS INDIA.

A Report on the Expedition to Western Yunan viâ Bhamo, by John Anderson, M. D.—THE AUTHOR.

The Christian Spectator, February, 1872.—THE EDITOR.

Professional Papers on Indian Engineering, 2nd Series, Vol. I. No. 3.—THE EDITOR.

Journal of Travels in India, by Ardaseer Framjee Moos.—THE GOVERNMENT OF INDIA, HOME DEPARTMENT.

The Rock Temples of Elephanta or Ghárápuri, by J. Burgess, F. R. G. S., M. R. A. S.—THE GOVERNMENT OF INDIA, HOME DEPARTMENT.

Chinese Materia Medica and Natural History, by F. P. Smith, M. B.—THE GOVERNMENT OF INDIA, HOME DEPARTMENT.

The Indian Antiquary, No. 1, January, 1872.—THE GOVERNMENT OF INDIA, HOME DEPARTMENT.

Records of the Geological Survey of India, Vol. IV., pt. 4, 1871.—THE GOVERNMENT OF BENGAL.

#### *Exchange.*

The Athenæum, November, 1871.—Nature, Nos. 110 to 114.

#### *Purchase.*

Comptes Rendus Nos. 17 to 20.—Revue des Deux Mondes, 15th November, 1st December, 1871.—The L. E. D. Philosophic Magazine No. 282, December, 1871.—The Annals and Magazine of Natural History No. 48, 1871.—Journal des Savants, October 1871.—The American Journal of Science and Arts, October, November, 1871.—The Indian Annals of Medical Science No. XXVIII.—Jacut's Geographisches Wörterbuch, Vol. IV., F. Wüstenfeld:—Ibn-el-Athiri Chronicon quod perfectissimum inscribitur, Volumen sextum, supplementum variarum lectionum ad Vol. XI. et XII.

The following Sanscrit MSS. have also been purchased for the Society.

ग्रन्थनाम ।	ग्रन्थकारनाम ।	पत्र०	श्लो०
इन्द्रागमन्त्रः .. ..	° .. ..	१२	२००
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लघुशब्देन्दुशेखरः .. ..	नागोजीभट्टः .. ..	४०५	११५२०
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चन्द्रांशुकः .. ..	जयदेवः .. ..	२०	२६०
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कातीयशब्दसूत्रभाष्यं .. ..	गदाधरदीक्षितः .. ..	४१	५००
कर्कभाष्यं .. ..	० .. ..	२१	८००
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मध्यमनोरमा, (सुवन्तपर्यन्ता, मध्यकौमुद्याः)	० .. ..	२०	१५००
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अपामार्जनसोचं .. ..	० .. ..	७	१०५
सरस्वतीसोचं .. ..	आश्वलायनः .. ..	५	१५१
दत्तकपुत्रविधानं .. ..	नृसिंहभट्टः .. ..	२	१२५
वासुपूजाविधिः (शकसोक्तः) .. ..	० .. ..	४	१५०
वासुशान्तिः .. ..	० .. ..	१	२५
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प्रार्थनाप्रायश्चित्तप्रयोगः .. ..	० .. ..	२७	१२००
प्रतिशास्त्रं .. ..	शैलकः .. ..	२२	९९०
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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR MARCH, 1872.

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A meeting of the Society was held on Wednesday, the 6th instant, at 9 P. M.

T. Oldham, Esq., L.L. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following gentlemen are candidates for ballot at the next meeting—

P. Whalley, Esq., B. C. S., proposed by Mr. H. F. Blanford, seconded by Mr. H. H. Locke.

Khwājāh Ahsanullah, of Dacca, proposed by Dr. James Wise, seconded by Colonel A. S. Allan.

Dr. V. Richard, Civil Surgeon, proposed by Mr. J. Beames, C. S., Balasore, seconded by Mr. H. Blochmann.

The following have intimated their desire to withdraw from the Society :—Dr. G. W. Leitner; J. A. Aldis, Esq.; Khalifah Sayyid Muhammad Husain.

The election of Nawāb Ziauddin of Loharū, Dillī, has been cancelled.

The following letter from Mr. Wyatt was read *on a Shoal of Dead Fish in the Indian Ocean*. The letter is addressed to Colonel H. Hyde.

‘The circumstances connected with the shoal of dead fish which I mentioned to you as having seen some time since in the Arabian Sea, were shortly as follows. I have no memoranda of the circumstances, but am tolerably certain of both date and locality within the limits I give.

‘The P. & O. Co.’s Steamer “Madras,” on a voyage from Suez to Bombay with H. M.’s mails on board and about 70 passengers, towards the end of September 1867, when between 12° and 13° N. Lat. and 50° and 55° E. Long., passed through a large number of dead fish, all tolerably



fresh when first remarked by myself, and evidently killed at or about the same time. None of them exhibited any signs of mutilation. They rather resembled the Grey Mullett in appearance, and averaged from 9 to 15 inches in length. They were floating generally at a distance of only a yard or two from each other, and extended over a field of some 200 miles east and west, the course we were steering at the time. No unusual appearances were remarked, except perhaps a little more than the average amount of phosphorescent light in the water at night. The weather was calm, and the Barometer and Thermometer about their average height for the season of the year. My impression at the time was, that the fish were killed by some volcanic or electrical agency, but this is pure conjecture on my part, as I have no grounds upon which to found the supposition except the absence of any external injuries sufficient to cause death in such specimens as I secured for examination.'

Mr. Wood-Mason mentioned the destruction of vast shoals of fishes by heavy gales in the Bay of Fundy recorded by Dr. Leith Adams, and alluded to the influence of volcanic sub-marine emanations on animal life.

The President reported on the part of the Council that the following gentlemen have been elected to serve on the several Committees of the Society—

## FINANCE.

Bábú Rájendralála Mitra.

Col. A. S. Allan.

L. Schwendler, Esq.

F. W. Peterson, Esq.

## LIBRARY.

The Hon'ble J. B. Phear.

Bábú Rájendralála Mitra.

Col. A. S. Allan.

Col. H. Hyde, R. E.

W. L. Heeley, Esq., C. S.

Dr. J. Anderson.

J. Wood-Mason, Esq.

G. Nevill, Esq.

Dr. Mohindralála Sarkara.

## PHILOLOGY.

E. C. Bayley, Esq., C. S., C. S. I.

Bábú Rájendralála Mitra.

W. L. Heeley, Esq., C. S.

C. H. Tawney, Esq., M. A.

Major-General A. Cunningham, C. S. I.

Rev. K. M. Banerjea.  
 Babu Gaur Das Baisak.  
 Dr. Mohindralála Sarkara.  
 Moulavi 'Abdul Latíf, Khán Bahádur.  
 „ Kabiruddín Ahmad Sáhíb.

## NATURAL HISTORY.

Dr. J. Ewart.  
 Dr. J. Anderson.  
 Dr. G. King.  
 W. S. Atkinson, Esq.  
 J. Wood-Mason, Esq.  
 G. Nevill, Esq.  
 H. F. Blanford, Esq.  
 W. T. Blanford, Esq.  
 V. Ball, Esq.  
 H. B. Medlicott, Esq.  
 D. Waldie, Esq.  
 Dr. Mohindralála Sarkara.  
 Dr. G. E. Dobson.

## PHYSICAL SCIENCE.

His Excellency Lord Napier of Magdala.  
 Col. H. L. Thuillier, C. S. I.  
 Col. H. Hyde, R. E.  
 Col. J. E. Gastrell.  
 H. F. Blanford, Esq.  
 D. Waldie, Esq.  
 J. Wood-Mason, Esq.  
 L. Schwendler, Esq.

## COINS.

E. C. Bayley, Esq., C. S., C. S. I.  
 Bábu Rájendralála Mitra.  
 Major-General A. Cunningham, C. S. I.  
 Major F. W. Stubbs.  
 Rev. M. A. Sherring.  
 J. G. Delmerick, Esq.

## THE COMMITTEE OF PAPERS.

The Members of Council.

The Council also report that, at the recommendation of the Finance Committee, the sum of Rs. 661, due from several members on account of subscription and entrance fees, has been written off.

The President then said—

GENTLEMEN,—Since the last meeting of the Society, the Members, in common with the community at large, have been stunned by the fearful suddenness, and awful nature of the destruction by the hands of an assassin of Her Majesty's representative in this country, who was also the Patron of this Society. It is not, gentlemen, the part of the Asiatic Society of Bengal to enter upon questions of a political nature, or to discuss their tendency or wisdom. And though certainly we do not sink the character of citizens, by becoming members of this learned association, we would relegate all such matters to other places and other times. It needed, however, no interest in public questions, no excitement as to imposition of taxes or change of policy, to appreciate the thorough, hearty, earnest, genial, manly chivalry of Lord Mayo's character, and we can fully realize the heaviness of the blow, and the severity of the loss, which, in common with the country at large, we have experienced.

I would suggest that we record on our Minutes a brief statement to this effect, and would propose it be

*Resolved*, That the Asiatic Society of Bengal has heard with profound regret of the fearful assassination of their late Patron, the Right Hon'ble The Earl of Mayo.

Carried unanimously.

Colonel Tennant exhibited five photographs taken by Captain J. Waterhouse of the last total eclipse, observed at Ootacamund.

The President said that Captain Fryer, a member of the Society, had that day arrived from Burma, and as he would be unable to attend another meeting of the Society, he now exhibited by permission a very fine assortment of celts collected in that province, and in which it was thought the members might feel interested. The President then asked Captain Fryer to say a few words about them.

Captain Fryer thanked the Society for kindly allowing him at such short notice to exhibit his collection of celts. He believed they presented a greater variety than any heretofore shown to the Society. In number they exceeded one hundred, and were peculiarly interesting as indicating that types other than the so-called Burman type had been found in the country. They had been collected from four districts, namely, Mergui, Tavoy, and Amherst in Tenasserim, and from Sandoway in Arakan. They had been met with either in the beds of streams or, as was more generally the case, in hill clearings by the Toungya or Joone cultivators. They were fashioned from different kinds of stone, such as chert, clink stone, green stone, basalt, jade, and some were of even softer material. They were both rough and

smooth, and comprised (a) adzes with shoulders, and (b) adzes without shoulders, each with a cutting edge like a chisel, (c) axes with the cutting edge like an axe, (d) a spear-head, and (e) a curious quoit-like disc of stone, the probable use of which was not apparent.

With respect to the adzes with shoulders, Captain Fryer stated that their analogue in iron existed in Burma, and was called 'Kyek tounge.' It was used by carpenters for cutting and sharpening boats.

The attention of the members was particularly directed to the large adze with shoulders found near Yangay village, Tavoy District, in length one foot, breadth  $3\frac{1}{2}$  inches, and one inch thick, weighing 3lbs. 7oz., also to the fine axe from Beloogyoon, Amherst District, 6 in. long,  $3\frac{1}{4}$  in. broad, and  $1\frac{1}{2}$  in. thick, weighing 1lb. 5oz.

As for the quoit-like stone, members were invited to contribute information as to the probable purpose for which it was originally designed.

Dr. J. Anderson said he had not met with the shouldered but with the wedge-shaped type of celts in Western Yunan. They were generally small, and a large percentage were of jade. All the specimens he procured, were purchased from the natives, who highly prized them, usually carrying them in a small bag attached to a button-hole of the jacket. Some were also offered for sale in the bazars; and it was to this circumstance that his attention had first been drawn to their existence at Momien and other localities in W. Yunan. They fetch high prices, as they are considered of medicinal value; and small fragments chipped off were sold at fabulous prices.

Dr. Anderson also mentioned that the same belief regarding celts prevailed in Yunan as in Burmah, that they are thunderbolts which, after their fall, were buried in the earth, and after many years had made their way to the surface again.

Mr. Blochmann exhibited several Persian inscriptions from Mr. Wilson, C. S., Badáon. He said:—

Some time ago, Mr. Wilson, C. S., Badáon, sent to the Society three Persian inscriptions, rubbings of two of which I now exhibit. Of the third, Mr. Wilson sent a copy. The rubbings are most extraordinary; the characters, especially of the second, are a perfect puzzle, and so difficult, that I have not succeeded in deciphering every word. The inscriptions are of interest, as belonging to the years 798, 877, 883, A. H., or A. D. 1395, 1472, 1478, a period for which Muhammadan Historians give but little information.

The first, of which Mr. Wilson has sent a rubbing, was found at Badáon; the large stone, however, which contains the inscription, is not attached to any building. The reading is as follows:—

بسم [الله الرحمن الرحيم] تاریخ بناء این عمارت چهنال ملك الشرق خانچهنانی...  
 ملك نيكبخت گزیده خدای بنا کرده چ نال و باغ و سراى  
 نبودست اینچا گم چاهنال که شد شهره سلطان مسکن درهماى  
 بهادر شهنشاه خان جهان که بزمست میدان جنگ آزمای  
 سخاست و غازی و عادل بهم بحسن مقالست نیکو بقای  
 که چاهست مسجد سراست باغ مروح مقامست نیکومست جای  
 همه خلق آسود گردند ازان که نافع خلایق بود دیر پای  
 بتاریخ هفصد نود هشت سال \* \* \* \* \* براله خدای  
 که [هم] دین و دنیا مراد تو باد همه خلق آمین کنیت دعای

## TRANSLATION.

In the name [of God the merciful and the clement]. The date of the building of the Canal-house of Malik ushsharq Khán Jahán [here follow three words not deciphered.]

The fortunate king, the chosen of God, has built the canal, the garden, and the sarái.

There was at no time a canal here [like this] through which the Alexander-like Sultán became famous.

He is a hero (*bahádúr*), a king of kings, the Khán of the world, for whom the field of battle is a feast.

He is liberal, a Ghází, and just, and condescending in address.

It is a well, a masjid, it is a sarái, a garden; it is a joyful place, it is a good place.

All people are satisfied with it, because that which is useful in its nature is lasting.

In A. H. 798, [several words are broken off] on the road to God.

May faith and the world be according to thy desire: all people say Amen, and we utter pious wishes.

In thought and language the inscription is one of the worst that I have seen. The metre is *Mutaqárib*. In the last distich, I have inserted a هم, as a syllable is wanting. I am doubtful as to the meaning and correctness of the word چهنال, for which the second distich has چاهنال. The original certainly looks like جاهدنا *jáhnád*; hence my translation "canal" (چاله and نال) is a mere guess.

The date 798, A. H., A. D., 1395, is quite clear. The first (prose) line should not be considered a chronogram, as such chronograms were not then in fashion.

The builder alluded to seems to be Khwájah Jahán Malik ushsharq, the founder of the Jaunpúr dynasty.

The second rubbing is taken from an inscription on Sayyid 'Aláuddín Sháh's tomb in Badáon, and is a sanad in which certain lands are set aside for the preservation of the tomb. A plate and explanatory notes will be given in the Journal.

Of the third inscription, Mr. Wilson sends the following reading:—

بنای این عمارت گنبد متین مخدومه جهان مرحومه مغفوره والده حضرت سلیمانی  
علاء الدنیا والدین شاه السلطان در عهد سلطنت سلطان مذکور مؤرخا التاسع عشر  
من رجب المرجب در سنه سبع و سبعین و ثمانیه مائه (sic) ॥

TRANSLATION.

The building of the strong vault of Makhdúmah Jabán, the late mother of his Majesty 'Aláuddunyá wad-dín Sháh, the king, [was made] during the reign of the said king. Dated 19th Rajab, 877, A. H. [20th December, 1472, A. D.]

Mr. Wilson says that her tomb is within the same building in which her son, the Emperor Sayyid 'Aláuddín lies buried. It is said that her body was removed there after the death of her son in 883, A. H.

Mr. Wood-Mason exhibited various articles of Nágá dress, etc., and an illustrated note-book lately received from Mr. S. E. Peal of Sibsaágá, Asám, containing an interesting account of a visit to several Nágá tribes. He drew the attention of the meeting to one of the sketches, which represented a mode of climbing trees precisely identical with that in vogue amongst the Dyaks of Borneo according to Mr. Wallace,\* and described by that eminent naturalist in the following terms:—

"As I was very anxious to get it (the Mias), I tried to persuade two young Dyaks who were with me to cut down the tree, which was tall, perfectly straight and smooth-barked, and without a branch for fifty or sixty feet. To my surprise they said, they would prefer climbing up it, but it would be a good deal of trouble, and after a little talking together, they said they would try. They first went to a clump of bamboo that stood near, and cut down one of the largest stems. From this they chopped off a short piece, and splitting it, made a couple of stout pegs, about a foot long and sharp at one end. Then cutting a thick piece of wood for a mallet, they drove one of the pegs into the tree and hung their weight upon it. It held, and this seemed to satisfy them, for they immediately began making a quantity of pegs of the same kind, while I looked on with great interest, wondering how they could possibly ascend such a lofty tree by merely driving pegs in it, the failure of any one of which at a good height would certainly cause their death. When about two dozen pegs were made, one of them began cutting some very long and slender bamboo from another clump, and also prepared some cord from the bark of a small tree. They now drove in a peg very firmly at about three feet from the ground, and bringing one of the long bamboos, stood it upright close to the tree, and bound it firmly to the two first pegs, by means of the bark cord, and small notches near the head of each peg. One of the Dyaks now stood on the first peg and drove in a third about level with his face, to which he tied the bamboo

\* The Malay Archipelago, Vol. I, pp. 54-56.

in the same way, and then mounted another step, standing on one foot, and holding by the bamboo at the peg immediately above him, while he drove in the next one. In this manner he ascended about twenty feet, when the upright bamboo becoming thin, another was handed up by his companion, and this was joined on by tying both bamboos to three or four of the pegs. When this was also nearly ended, a third was added, and shortly after, the lowest branches of the tree were reached, along which the young Dyak scrambled, and soon sent the *Mias* tumbling headlong down. I was exceedingly struck by the ingenuity of this mode of climbing, and the admirable manner in which the peculiar properties of the bamboo were made available. The ladder itself was perfectly safe, since if any peg were loose or faulty, and gave way, the strain would be thrown on several others above and below it. I now understand the use of the line of bamboo pegs sticking in trees which I had often seen, and wondered for what purpose they could have been put there."

Mr. Mason hoped that the Society would encourage Mr. Peal to continue his valuable observations by publishing the interesting notes and sketches he had already made.

The following papers were read :—

1. *The Ruins of Kopari, Balasore District.*—By J. BEAMES, Esq., C. S.

The Secretary read portions of the paper, and exhibited the tracings made by Mr. Beames. The article will appear in the forthcoming number of the Journal.

2. *On the Osteology of Triænops Persicus.*—By G. E. DOBSON, B. A., M. B., Assistant Surgeon H. M.'s British Forces.

(Abstract.)

This paper is a continuation of one, by the same author, "On a new genus and species of *Rhinolophidae*, &c.," published in Vol. XL., Part II., No. IV., of the Journal.

It contains a detailed description of the skeleton of the species on which the genus *Triænops* was founded. The nearest affinities of the genus are shown to be with *Phyllorhina* with which it agrees in the number and relative lengths of the bones of the fingers, in the relative number of the bones of the toes, and in the form of iliac bones. It differs, however, from *Phyllorhina* and from other genera of *Rhinolophidae* in many important characters of which the principal number are met with in the skull and in the sternal bones.

The author compares the osteology of the genera *Rhinolophus*, *Phyllorhina*, *Triænops*, and *Cælops*, and arranges them under two sub-families, distinguished by the relative number of joints in the toes and by the form of the iliac bones.

3. *On the best resistance of the coils of any Differential Galvanometer.*—By LOUIS SCHWENDLER, Esq.

(Abstract.)

Mr. Schwendler gave a short outline of his investigations, stating that it would be impossible for him to read the paper in full on account of its intricate and purely mathematical character; he would give, however, the general results obtained and show their advantages when applied, illustrating his explanations on the black board and by a Differential Galvanometer placed on the table; the paper itself would be published in Part II, of the Journal.

In that most common form of the Differential Galvanometer, when the two coils are fixed and of equal resistances and equal magnetic moments, Mr. Schwendler found that the following interesting and most simple relation should exist between the resistance of the Galvanometer coil and the resistance to be measured, in order to have the greatest possible sensibility, namely, that—

*The resistance of the Galvanometer coil should be one-third of the resistance under measurement*—supposing that the resistance of the testing battery common to both the coils can be neglected against the resistance to be measured.

Mr. Schwendler remarked that the Differential Galvanometers at present employed in the Government Telegraph Department of India, have a far too low resistance, and that this, to a certain extent, explained the great want of sensitiveness of these instruments when used for measuring resistances higher than 600 units.

If the coils had a resistance of about 2500 units each, instead of 200 only, the sensitiveness of these instruments would at once be nearly trebled, a fact which shows the great advantage to be derived from the application of Mr. Schwendler's results in the construction of Differential Galvanometers.

4. *On the Syphon Recorder.*—By W. E. AYRTON, Esq. (Abstract.)

Mr. Ayrton said that on land telegraph lines three distinct methods are employed for receiving messages. By the first the signaller sees the motion to the right or left of a small magnetic needle; by the second he hears the sound of one or other of two bells of different tones, or what is virtually the same thing a short or a long interval between two distinct clicks produced by a small magnetic hammer striking against a stop in its downward and upward motion; and by the third method the message is printed on a strip of paper either in ordinary Roman letters as in the House or Hughes' instrument, or, as in the Morse instrument, in a symbolical alphabet of dots and dashes, which have to be translated by the receiving signaller.



The great advantage of any system by which an automatic record is obtained is, that should there be any difference between the message written by the sender and the message sent out to the receiver, it is easy to find out whether the mistake was made by the sending or the receiving signaller, since what is printed on the slip of paper at the receiving station is entirely under the control of the signaller at the sending station.

On long submarine cables, however, such as the Atlantic, Red Sea, &c., as the battery power employed can only be exceedingly small compared with that used on a corresponding length of land line, only one of the above mentioned methods of receiving messages can be adopted, *viz.*, the motion of a small magnetic needle. To render the angle large through which a weak current will deflect this needle, the moment of inertia of the needle has to be very small, that is to say the needle has to be short and light. To see the actual motion of such a needle, would therefore be a difficult matter. This difficulty, however, was overcome some years ago by Sir W. Thomson's reflecting galvanometer. But the instrument is not only far too feeble to produce any mark on paper, but in addition it even touched any stops placed to limit its motion too feebly to act thereby as a "*relay*" in completing the circuit of a current generated in the receiving office.

The problem to be solved, therefore, is virtually the following: How is it possible to write with a pen on paper, if only an exceedingly small power is to be exerted on the pen. This Sir W. Thomson has succeeded in solving in his '*Syphon Recorder*.'

Mr. Ayrton then gave a minute description of the invention.

The receipt of the following communications was announced—

1. *On a new Indian Sylvia*.—By W. E. BROOKS, Esq., C. E., *Etawah*.
2. *The Syphon Recorder*.—By E. W. AYRTON, Esq.
3. *On the Osteology of Trianops Persicus*.—By G. E. DOBSON, Esq., M. B.

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#### LIBRARY.

The following additions have been made to the Library since the meeting held in February last.

#### *Presentations.*

••• Names of Donors in Capitals.

Notices of the Astronomical Society of London. Vols. I, II, III, and XXXI.—Memoirs of the Astronomical Society, Vol. XXIX, part I.—Chinese Observations of Comets, by J. Williams.—THE ASTRONOMICAL SOCIETY OF LONDON.

Report of the British Association, for 1870.—THE BRITISH ASSOCIATION.

Journal of the Royal Geological Society of Ireland, Vol. III., part I, New Series.—THE ROYAL GEOLOGICAL SOCIETY OF IRELAND.

Monatsbericht für September and October, 1871.—Königlich Preussische Akademie der Wissenschaften zu Berlin.

Journal Asiatique, Mai, Juin, et Juillet, 1871.—ASIATIC SOCIETY OF PARIS.

Bulletin de la Société de Géographie, Decembre, 1871.—GEOGRAPHICAL SOCIETY OF PARIS.

Catalogue of Scientific Papers, Vol. V.—Philosophical Transactions Vol. 160, part II, 1871,—ROYAL SOCIETY OF LONDON.

Christian Spectator, No. 9.—THE EDITOR.

Indian Missionary Manual, by J. Murdoch.—Catalogue of Christian Vernacular Literature of India, by J. Murdoch.—Letters to Lord Napier on Education in India, by J. Murdoch.—THE AUTHOR.

Report of the Meteorological Reporter to the Government of Bengal, for 1870, by H. F. Blanford.—THE AUTHOR.

La Langue et la Literature Hindoustanie en 1871, par M. Garcin de Tassy.—THE AUTHOR.

Ramayana, edited by Hema Chandra, Vol. 2, Part 13.—THE EDITOR.

On the study and value of Chinese Botanical works, by E. Bretschneider, M. D.—THE AUTHOR.

Sukla yajushi Mādhyandiniya Sākhya Vājasaneyā Sanhitā, Part 3, edited by Chiranjīva garudadvaja.—THAKURA PRASADA SINHA.

General Report of the Operations of the Trigonometrical Survey of India, for 1870-71.—TRIGONOMETRICAL SURVEY OFFICE.

Catalogue of MSS. from Gujrat, No. 1.—Flora Sylvatica, by Major Beddome, XIII—XVI.—Icones Plantarum Indiarum Orientalis, by Major Beddome, Lat. VIII.—Geology and Zoology of Abyssinia, by W. T. Blanford.—GOVERNMENT OF INDIA.

Annual Report on the Administration of the Territories under the Lieutenant-Governor of Bengal, for 1870-71.—THE GOVT. OF BENGAL.

#### *Purchase.*

Muir's Sanscrit Text, Vol. II.—The Indian Antiquary, part III.—The Westminster Review for January, 1872.—The Numismatic Chronicle, No. 43.—Revue de Zoologie, Nos. 7-9.—Revue Archeologique, Nos. 11-12.—Revue des Deux Mondes, 1 January 1872.—Grimm's Wörterbuch, Vol. V, part II.—Journal des Savants, November 1871.—Reeves' Conchologia Iconica, parts 290-291.—Comptes Rendus, Nos. 21-26.

#### *Exchange.*

Nature, 115-117.—The Athenæum, December, 1871.



# PROCEEDINGS

## OF THE

# ASIATIC SOCIETY OF BENGAL,

### FOR APRIL, 1872.

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The monthly meeting of the Society was held on Wednesday the 3rd instant, at 9 P. M.

T. Oldham, LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table,—

1. From the Royal Norwegian University, — 30 specimens of minerals and shells from Norway.
2. From Rev. J. Long, — eleven volumes of grammatical and religious works.
3. From the Author, — a copy of Sanskrita Brahmāṇḍa Vivṛttiḥ.
4. From Col. A. S. Allan, — three volumes of old botanical works.
4. From Sirdār Attar Sing Bahādur of Bhadaur, — a silver coin of

Udaipur,

चित्रकूट । उदयपुर  
दोसि डलन

Chitrakūṭa. Udayapūra, coin of  
friendship of London.

and a silver coin of 'Alāuddīn Muhammad Shāh, of Dihlī. The legend is, as usual—

السلطان الاعظم علاءالدنيا والدين ابوالمظفر محمد شاه السلطان سكندر  
الثاني ناصر امير الخلافة امير المؤمنين ضرب في حضرت دهلي

5. From Professor C. A. Holmboe of Christiania, — three pamphlets on Budhistic Tumuli in Asia and pre-historic remains of Norway.

6. From Rev. M. M. Carleton, Ambāla,—several Bactrian copper coins.

The following gentlemen duly proposed and seconded at the last meeting were balloted for and elected Ordinary Members—P. Whalley, Esq., B. C. S. ; Khwājah Ahsanullah of Dacca ; Dr. V. Richards.

The following are candidates for ballot at the next meeting,—

W. Heilgers, Esq., proposed by Dr. F. Stoliezka, seconded by Mr. D. Waldie.

Bábu Mahinúchandra Chakravarti, Barnagore, proposed by Mr. H. Blochmann, seconded by Bábu Rájendralála Mitra.

Bábu Niranjan Mukerji, Banáras, proposed by Bábu Rájendralála Mitra, seconded by Mr. H. Blochmann.

The Council reported that they have elected Sir R. Couch a member of Council and Vice-President, in place of the Hon'ble J. B. Phear, leaving India.

Col. J. E. Gastrell has been elected a Trustee of the Indian Museum, during the presidency of Dr. T. Oldham, Superintendent Geological Survey of India, and Treasurer of the Society, in place of Col. Tennant, proceeding to Europe.

The Council further recommended that Mr. G. B. Airy, the Astronomer Royal, and President of the Royal Society, be elected an Honorary Member of the Society.

In recommending this election, the Council do not deem it necessary to enter into the details of Professor Airy's numerous and most valuable contributions to Science, extending over nearly half a century, but merely to draw the attention to the great influence which his labours have had upon the progress of Physic and Astronomy. The ballot will take place at the next meeting of the Society.

At the recommendation of the Philological Committee, the Council have sanctioned the publication of the *Akbaránámah* in the *Bibliotheca Indica*, Persian Series.

The following extract from a letter by Mr. Thomas, addressed to E. C. Bayley, Esq., C. S. I., was read :

"We have found amongst Elliot's papers a most interesting account of the buildings and water works of Jerusalem of Náçir bin Khusrau (A. D. 1045). As we cannot use this in the *Indian History*, Dowson is to edit the work in a separate volume. The man is most precise in his description and had we known of the existence of Capt. Toler's (?) translation, we might have saved the Palestine exploration people some digging."

The following letter from D. S. Somanatyssa, Chief Priest of the Paraná Nanda Temple, Galle, Ceylon, has been communicated by Mr. E. C. Bayley—

'I regret very much that I have not been able to acknowledge earlier the safe receipt of all the catalogues of Sanskrit works which you have the kindness to remit to me occasionally. I am very much obliged to you for

them, and crave that I may be favoured with any future publications of a similar kind.

'The Government of Ceylon has very prudently pursued the steps of that of India in using measures for the preservation of the library records of this island, and an oriental library has already been established at Colombo, the chief town, and copies of all the valuable manuscript Pali and Sanskrit works are now being made, under the auspices of local Committees (of which I am a member at Galle), established at the principal towns in the island. The work is now being carried out, and I am sanguine that it would prove in the end to be one of the most useful undertakings that has ever been inaugurated by our benign Government.

'I have posted along with this letter a pamphlet edited by a native gentleman, being a review of Max Müller's *Dharmapada*, and trust that a perusal of it will prove useful to you.

'I have not been able to procure yet a copy of the "Descriptive Catalogue of Books in Ceylon," published a short time ago, and a copy of which I promised you. A copy will be sent to you as soon as I get one.

'I shall thank you to write to me of any literary works that you may be in need of from this quarter, as it will have my best attention, &c."

The President exhibited a beautiful Manuscript of the *Mahábhárat*, which had been sent for that purpose by Messrs. Gisborne and Co., Calcutta.

The following papers were read—

- 1.—*Notes on the age of the ruins chiefly situated at Banáras and Jaunpúr*,—  
by C. HORNE, Esq., late B. C. S.

This paper, like several others contributed by Mr. Horne to the Society's Journal, treats of the antiquities of Jaunpúr and Banáras, and discusses the use which Muhammadan builders have made of the materials of old Hindú and Buddhistic temples. The paper is accompanied by a photograph of a portion of the Jaunpúr mosque, and a list of Gupta words.

- 2.—*Translations of selected portions of Chand's Epic, Book I*,—  
by J. BEAMES, Esq., C. S., Balasore.

Mr. Beames has translated several passages from the first book of Chand's Epic, of which he lately sent to the Society the text of the first 1200 lines with the words properly divided. The restoration of the text and the translation of even single portions are matters of the greatest difficulty. The Pandits of Rájputáná even do not understand Chand beyond the general drift of the poem. The translations are made by Mr. Beames from Tod's MS. of Chand in his possession, which in his opinion is by far the best, having been very carefully prepared for him by a Pandit in the service of the Ráná of

Koṭā. The first book of Chand does not, as has been supposed, consist of uninteresting invocations. "At stanza 45," Mr. Beames says in a letter, "begins the legendary history of the Rājput race with the story of Parīkshita, then follows Janamejaya's serpent sacrifice, the foundation of Mt. Ābū by the sage Vasiṣṭha, the birth of the Chauhān from the fire fountain (Avalakunda); the lives and deeds of the earlier sovereigns of the race, Bisal Deo, Āna Deo, Śarang, and Anal Deo; the building of Ajmīr, and Sambhari; the birth of Somesar; the father of Prit'hirāj; the gathering of the clans for the great fight with the Chalukyas (which Chand dates Samvat 936, by a curious error); a long and most valuable list is here afforded of the old Royal races of the Rājputs, of great antiquarian interest; the birth of Chand himself at Lāhor; and last, though not least, the birth of Prit'hirāj himself. I do not hesitate to say that the first book, one of the longest in the whole poem, is also one of the most important and interesting. The second book is more legendary, but contains a great many valuable historical and geographical notices."

Mr. Beames also promises to continue his contributions to Chand, which to all Hindi scholars will be of the greatest assistance.

3.—On an Aracanese Coin,—by CAPT. G. E. FRYER, OFFICIATING DEPUTY-COMMISSIONER, SANDOWAY.

Before entering upon the subject of his paper, Capt. Fryer said he wished to say a few words respecting the two fragments of stone, now exhibited, together with a photograph by Capt. Waterhouse, bearing an inscription in old Sanskrit characters of about the 8th or 10th century A. D. The pieces of stone had been handed to him just before his departure from Sandoway by a native official who stated that they had been found in the jungle near the village of Byeewa in the Sandoway District.

Bābū Pratāpachandra Ghosha to whom the inscription had been shown, considered the characters to comprise in four small lines the first couplet of the Buddhist text, and he proposes to read them thus:—

- (1.) Ye dharma hetu pra
- (2.) bhava hetun teshām Tathā gubha
- (3.) Teshām Tathā gata hyava
- (4.) Vat evam vādi Mahā Śramanā.

These words are not exactly the same as in the inscription on the stone extracted from the Sarnath tope near Banāras (*vide* Pl. IX, Vol. IV, Jour. As. Soc. Bengal), but the differences are immaterial.

Capt. Fryer promised on his return to cause search to be made for the remaining portions of the inscription, and to communicate the results to the Society.

Capt. Fryer then read his paper, the subject of which is a small silver coin of about the size of a four-anna piece. He refers it to the Vaisali

dynasty of Aracan. The paper will be printed, together with a drawing of the coin, in the second number of the Philological Part of the Journal.

4.—*Notes on Ghargáon, Asám*,—by J. M. FOSTER, Esq., F. R. G. S.

Mr. Foster gives a description of the town of Ghargáon, the old capital of Asám, the ruins of which lie close to the Nazirah on the Dik'hú river, a tributary of the Brahmaputra. Several plans of Ghargáon and environs of the old palace of the Rájahs, and two photographs of the latter, accompany the paper. Mr. Foster has collected the notes of former writers on the subject, and gives among others an interesting extract from a work on 'Shipwrecks' regarding the adventures of several Dutch sailors who were forced to accompany Mir Jumlah's fleet to Asám in 1662. It would appear that a large number of Portuguese and English accompanied the General.

The paper will appear in No. I of the first part of the Journal for this year.

5.—*Note on Father Tieffentaller, of the Society of Jesus and Missionary-Apostolic in India, &c.*,—by LT.-COL. A. S. ALLAN.

The Reverend Father Joseph Tieffentaller, known as a Missionary in India, and voluminous writer on the topography and statistics, as well as on the religion and natural history of many parts of this country, was born about the year 1715, at Boesano, or Botzen, in the Austrian Tyrol. Having, at an early age, embraced the rule of St. Ignatius, he left his native country, in the year 1740, for Spain, where he remained for two years, awaiting an opportunity of proceeding to India, the scene of his future labours. The vessel, in which he embarked, landed him at Manilla, in the Spanish Philippine Isles, and he was unable to reach India until December 1743, when he arrived at Daman near Goá; thence he proceeded to Súrat, returning to Daman in March 1744. In September of the same year he again visited Súrat, and afterwards proceeded to Bhroch, Barodah, Gudasa(?), Laravara(?), Sagwara(?) Udaipúr, Jaipúr, Dig, and Ágrah. In 1745, he visited Mathurá and Bindrában; in 1747, Dihlí, whence he proceeded to Narwar, on the banks of the Sindu, south-east of Gwáliár, where there was then a colony of native Christians. He remained at Narwar until 1750, when he says that he returned to Goá, from which it appears that he must have first arrived at that Portuguese city, before going to Daman, especially as he does not state explicitly that he arrived at Daman from Europe. In the same year he travelled back towards Narwar by way of Jodhpúr, and Ajmír. From Narwar, which he reached in April 1751, he visited Gwáliár, Gohud, and Ágrah, returning to Narwar, by another route, in November following; his permanent station was there for a period of twelve years, but during that time he paid several visits to Ágrah and Dihlí, (and also apparently to Láhor,) to see his worthy friend, Father Andreas Strobl, S. J., who had been sent for with another savant,



from Germany (before 1739 and who died 30th March, 1751 at Agra) by Jai-Singh II, the Astronomer Rājāh of Jaipur. Father Tieffentaller was compelled by poverty to leave Narwar early in the year 1765, and he resolved to proceed to Bengal, as he says "to test the liberality and generosity of the celebrated English nation." He saw Dātiah, Jhānsī, Kālinjar, Pannah, and Allāhābād, in his journey; thence he proceeded to Lucknow, Banāras, Patna and finally to Calcutta, returning to Allāhābād in October of the same year. In 1766, he visited Korrah, but proceeded ultimately to Lucknow, and spent the remainder of his life there; during which time he occupied five years in travelling over the greater part of Audh including Farrukhābād, and to the foot of the Kamāon hills, and the falls of the river Ghāgrā. He took careful bearings of all the places of note, having numerous valuable scientific instruments in his possession; and he certainly appears to have been eminently qualified for the task he imposed on himself.

During his latter years he suffered severely from repeated attacks of gout, in addition to the infirmities of age; and he died, aged upwards of eighty years, at his residence in Lucknow on the 5th July, 1785. His remains were conveyed to Agra, and interred in the Catholic cemetery there. The Register of Baptisms and Marriages, in his own handwriting, recorded generally in Latin, but occasionally in his native German, extended from 4th February, 1765, to 31st May, 1784, and was preserved among the ecclesiastical documents belonging to the Catholic Church of St. Mary at Lucknow. On the outbreak of the mutiny in June 1857, all these interesting records were burnt, together with the Church and the house of the Priest where they were kept. I fortunately, during a residence at Lucknow just before that sad year, made extracts from those papers, and am enabled to state the exact period of the death of F. Tieffentaller, which date had been previously unknown in the notices published of this learned Jesuit. The 'Biographie Universelle, and other foreign authorities, merely state that he was "alive, and living at Agra, in 1785." Strange to say no *English* work on Biography takes any notice of his name, at least none of those I have been able to consult, such as Chalmers, Rose, &c., an omission difficult to account for; and even the French authorities as well as the Italian and German ones are very meagre and brief. It would not have been necessary to have entered so fully into the Indian career of this earnest inquirer into topics of interest connected with this country, but for the dearth of published materials regarding him to which I have above alluded, and I shall conclude this paper with a notice of the writings of Father *Tieffentaller*, whose name I may mention has thus been written on the authority of his own signature (which I have seen verified) and not, as generally given, *Tieffenthaler* or *Thieffentaler*.

During an uninterrupted residence of nearly forty-two years in India, he employed the leisure hours of his missionary life in collecting information

regarding the literature, customs and religion of the Hindus, as also on the topography, and natural history of this country. The celebrated M. Anquetil Du Perron, when at Súrat in 1759, wrote to Father Tieffentaller, requesting information about the Mughul Court, and the antiquities of India. He received this communication while at Narwar, and at once replied that he would be happy to afford him all the information in his power on these subjects, asking in return for any scientific works that could be spared, and especially the correct longitude of Súrat, as he was occupied in a work on the *Geography of India*, with the latitudes of various places. In 1776, M. Anquetil Du Perron received from F. Tieffentaller, with a letter dated from Agrab, three charts or maps of which that learned French orientalist gave a detailed account in the *Journal des Savants*, for the month of December, in that year. In the same letter he informed him that he had sent the following works to a medical Professor in the University of Copenhagen—

1. 'Description Géographique de l'Indostan.'
2. 'De la Religion Brahminique.'
3. 'Astronomie et Astrologie Indiennes, et système du monde selon les Gymnosophistes.'
4. 'Des Idoles des Indiens, et de leur forme, et des plus célèbres pèlerinages de l'Inde.'
5. 'Histoire naturelle de l'Indostan, contenant la description des animaux, des oiseaux, et des plantes, avec des figures enluminées.'

John Bernonilli of Basel in Switzerland (the well known savant, astronomer and member of the French Academy, who died in 1807 at Berlin), subsequently ascertained that these precious MSS. were in the possession of M. Kratzenstein, a Professor in Copenhagen, and succeeded in obtaining from him in October, 1871, the geographical portion of Father Tieffentaller's works, which he translated into French and German from the Latin in which it was written and published, in 1786, at Berlin in 3 volumes 4to., of which there is a copy in our Library, (No. 2214), as also in the Calcutta Public Library; to which I will, therefore, refer those desirous of perusing the work itself.

This work is curious and interesting, being illustrated by numerous copper plates of the principal places described by this Jesuit Missionary, from sketches done by himself, which evince considerable artistic merit. Amongst these is a bird's eye "Elahbas," as *Allahábád* is styled, and in which, singular to say, the famous *Asoka Pillar*, is represented as *standing* close to the gate of the Fort there, where it long lay on the ground, and was only set up again, about forty years ago. It is, therefore, clear that this singular obelisk, which has thrown such a flood of light in the ancient history of India, through Prinsep's interpretation of the inscription engraved in its sides, must have either fallen or been thrown down, after Allahábád came into the possession of the British—though of that event or accident, no re-

cord is now known, as far as I am aware. The views of the "Palatium quod Laknoi dicitur, ripæ Gumatis adsitum," and "Palatium Banglæ, seu Fesabadi recens conditum, Gagræ ripæ adsitum," are also deserving of notice; the ruins of the latter, over parts of which the river sand has now drifted, I have personally visited and examined, and can testify to the resemblance. There are other sketches of interest in this volume, (now before you), which are valuable as the only representations now in existence such as Dátiah, Gwáliár, Ajígarh, Gorák'hpúr, &c.

Without trespassing longer on your attention, I would notice in conclusion, that Father Tieffentaller states that he had prepared an account of the beasts, trees, and plants of India, illustrated with *coloured* drawings, but this was never published, nor could I ascertain what had become of it. After careful enquiry and examination of the ecclesiastical records at Lucknow, in 1855, no such MSS. were then in existence, and it is to be feared that they have perished, like so many other precious documents, left to the ravages of white ants in this country, through the neglect and carelessness of their custodians.

6.—*More Buddhist Ruins in Orisá*,—by J. BEAMES, ESQ., C. S.

Mr. Beames's paper contains a few additional remarks to his paper on the Ruins of Kopári, printed in last year's Journal, and will be printed in the forthcoming number.

7.—*Koch Bihár, Koch Hájo, and Asám, in the 16th and 17th centuries, according to the Akbarnámah, the Pádisháhnámah, and the Fathiyah i 'Ibriyah*,—by H. BLOCHMANN, M. A., Calcutta Madrasah.

(Abstract.)

Mr. Blochmann read the introduction of his paper and a chapter on Asám and the Asamese in 1662, according to the *Fathiyah i 'Ibriyah* of Shihábuddin. He traced the Eastern frontier of Bengal at the time of the Mughuls from the P'hani River, east of Bhaluah and Nawák'hálí, along the western portion of Tiparah over Silhat and Látú (or Ládú, as spelt by Muhammadan historians) to the southern part of Parganah Karibáí, from where the Brahmaputra formed the boundary as far as Parganah Bhitárband; from thence the boundary passed westward to Pátgáon and the north of Púrniah. Morang, Koch Bihár, Koch Hájo, Kámrúp, and Asám did not belong to the empire under Akbar.

During the reign of Jahángír, Koch Hájo, which coincides with the modern district of Gwálpará, was conquered and annexed; and under Sháh-jahán Kámrúp, or Lower Asám between Gwálpará and Gauháí, was also occupied. Towards the end of Sháh-jahán's reign, the Koch Bihár and

Asám Rájahs attacked Koch Hájo, and forced the Imperialists to withdraw from the province. This repulse was the cause of Mír Jumlah's expedition to Asám in 1662.

Mír Jumlah invaded Koch Bihár, recovered Koch Hájo, and occupied Central and Eastern Asám for fourteen months. The most eastern part to which he advanced is marked by the intersection of Long. 95° and Lat. 27°, or the districts east of Sibságar and Nazírah. In the expedition to Rakhang (Arakan), which was undertaken immediately after Mír Jumlah's death, the most southern part which the Mughuls reached, is Rámú or Rambú, half way between Chátgánw (Chittagong) and Akyab. Beyond these two points the Muhammadans did not advance.

Mr. Blochmann has collected all notes regarding Koch Bihár, Koch Hájo (the 'kingdom of Azo' of early European travellers in India) and Asám, from the Akbarnámah, the Tuzuk i Jahángíri, and the Pádisháhnámah. He then gives a free translation of the *Fathiyah i 'Ibriyah*, or, as the book is sometimes called, *Tárikh i Fath i Ashám* (Conquest of Asám), in 1662 by Mír Jumlah. The author of this work, a native of Persia, was a clerk in the employ of Mír Jumlah, and wrote the book in 1662-63, because the official reporters, in Mír Jumlah's opinion, did not send correct accounts of the progress of the expedition to court. The author of the *'Alamgírnamah* appears to have used the *Fathiyah i 'Ibriyah* for his history.

Shiháb's work contains many interesting remarks on Asám and the Asamese, and on several of the aboriginal tribes. The book ends with the death of Mír Jumlah, on the 2nd Ramazán, 1073 at Khizrpur was Dháká.

The paper will be printed in the first part of the Journal for 1872.

The reading of the two following papers was postponed—

8.—*Monograph of Indian Cyprinidæ, Part IV*,—by Surgeon F. DAY.

9.—*Notes on the Reptilian Fauna of Katch*,—by DR. F. STOLICZKA.

The following communication was received.

*The Muhammadan Inscriptions of Bihár*,—by A. BROADLEY, ESQ., C. S.,  
and H. BLOCHMANN, ESQ., M. A.

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*The Swans of India*,—by W. E. BROOKS, C. E., *Etdwah*.

(Recd. 18th December, 1871.)

Dr. Jerdon, in his third volume of the Birds of India, page 778, appears to doubt the occurrence of swans in India.

Amongst Mr. Hodgson's original drawings is one of a swan in mature plumage, which, judging from the diamond shaped yellow patch at the base of the bill, on each side of the upper mandible, is undoubtedly *Cygnus ferus*.

A note on the drawing states the specimen to have been lost. Some of Mr. Hodgson's boxes of specimens were lost on their way to England.

The drawing is marked "*Cygnus ferus*, wild swan," in Hodgson's own handwriting. Another note states, that the bird was "shot in the valley of Nepal, January, 1829."

This swan should, therefore, have been included in Jerdon's Birds of India, for many of the birds therein described stand upon the occurrence of a single specimen.

In the last No. of the Ibis, that for October, 1871, page 412, Mr. Hume describes a pair of swans, killed on the 17th January, 1871, at the Jubbee stream, on the borders of the Hazára and Ráwalpindi districts. He also observes, that "swans appear to be regular annual visitants to this locality, and several places lying between Ráwalpindi and the western limit of the Peshawur valley."

Upon Mr. Hume's description of this pair of swans, the editor of the Ibis remarks: "The birds here described appear to us to be referable to the young of *Cygnus olor*, the tubercle of the bill being undeveloped, and the yellow of the anterior portion of the bill not yet assumed."

In this opinion the Rev. H. B. Tristram entirely concurs, with greater certainty than expressed by the editor of the Ibis; this in a letter to me, so that we may safely also add this species to the Indian list.

The swans of India are therefore *Cygnus olor* and *Cygnus ferus*.

The latter bird was added by Hodgson, and is included in Gray's Catalogue of Hodgson's drawings and specimens, presented to the British Museum.

*The Imperial Eagles of India,—by W. E. Brooks, C. E., Etáwah.*

(Recd. 21st February, 1872.)

It has been supposed by many, that the Indian Imperial Eagles were all referable to one species, which was again identical with the European bird.

The European species, true *Aquila imperialis*, Bechst., is, however, quite distinct from our Indian birds, as Mr. Howard Saunders has recently shown in a late number of the P. Z. S.

The young of the European bird is a plain tawny brown, and is never lineated. The old bird differs from our Indian species in having white on the ridge of the wing, as well as white scapular feathers. Neither of our Indian birds can, therefore, any longer retain the name of *imperialis*.

There are four stages of Imperial Eagle found in India, and the East generally. These have been referred to one species by Dr. Jerdon and others, but were distinguished by Mr. Hodgson.

They are of two distinct species, *Aquila crassipes*, Hodgson, and *Aquila bifasciata*, Gray and Hardwicke.

The former has three well marked stages.

1st.—Light brown plumage, lineated both above and below. Each feather possesses a light fulvous central stripe. The tail is, as a rule, plain dark brown, with a light tip, and it is not barred.

2nd.—A very dark black brown plumage, both above and below, save the upper part of the head and nape, which are buff or fulvous. The tail changes to blackish brown, or nearly black, the upper part being barred with grey, and the end having a broad four-inch band of black. The top of the head has also generally a patch of brown.

3rd.—The same as the 2nd stage, with the addition of snow white scapulars, to a greater or lesser extent.

I am correct in stating that the striped bird passes directly to the old black brown bird with light head and am not advancing a theory of my own, for Mr. Anderson of Futtehgurh has shot two changing birds (which he has kindly lent to me). These have numbers of the lineated feathers still remaining, intermixed with greater numbers which are black brown. I believe a change of colour in these feathers takes place, without a moult. The tail of one bird is partly changed (by a moult) to the adult tail with grey bars, and dark terminal band.

*Aquila bifasciata*, Gray and Hardwicke, our second species, appears only to have two well marked stages.

1st.—The whole bird is a very pale dull grey brown, sometimes speckled slightly with fulvous on the abdomen. There are two broad fulvous wing bars, formed by the broad light tips of the greater coverts, and those of the secondary quills. The tail has also a light tip, and is generally slightly barred with hoary grey.

2nd.—The very pale brown changes to a rather darker brown, which is still but a dull light toned brown; the wing bars disappear, and the tail is strongly marked with wavy grey bars on a dark brown ground. There is no dark terminal band, but the barring is continued to the end of the tail.

The only further change towards maturity in this Eagle which I have seen, is, that the back of the head, and nape of the neck, become buff coloured, or fulvous. The head then resembles that of mature *crassipes*, but the brown of the body is not half so dark, being a sort of earthy brown; "soil brown," as Mr. Hodgson expresses it.

Mr. Hodgson has two drawings of the Eagle one in the first stage, or typical *bifasciata*; and the other in what I take to be the mature bird, with buff nape. He has another drawing termed *A. Nipalensis*, which is clearly a very pale example of a *bifasciata* in its first stage. I possess a bird almost as pale.

In coming to the above conclusion that our Imperial Eagles formed two distinct species, I had the use of a very fine series, composed of Mr. Anderson's birds as well as my own.

It was very pretty to see how distinctly the striped bird passed to the old black one, and to see how decidedly distinct each specimen of *A. bifasciata* was from all those of *A. crassipes*.

In size, the two birds are much the same.

A living specimen of the young striped bird, from China, has been recently added to the Zoological Society's collection; and Dr. Selater has had a drawing made of this bird, to see what it will turn to. Mr. Hodgson has two drawings of the striped bird which he terms "*Aquila crassipes*." These drawings are very accurate.

*On a new Indian Sylvia*,—by W. E. BROOKS, C. E., *Etawah*.

(Recd. 24th February, 1872.)

*Melizophilus striatus*, sp. nov.

Description. Above light brownish grey, streaked on the head, as far as the shoulders, with dark brown narrow streaks. A pale rufous-brown broad supercilium; the cheeks and ear coverts are also of this colour, which extends down the sides of the neck and breast, becoming very pale and diluted under the wings, and on the flanks. Wings light brown; the edges of quills and coverts greyish. Tail a very much darker, or blackish brown; the outer feather on each side is rather lighter, and is tipped with white. The tail feathers are cross-rayed, particularly the outer ones.

Lower surface of body, except sides of neck, breast and flanks, white, with narrow brown streaks from chin to upper breast. These streaks are well-defined in one specimen, and faint in another. Lining of wing, and ridge of the same, reddish white. Bill dark brown, except basal half of lower mandible, which is dull brownish orange. Legs and feet yellowish brown; claws brown. Length 4·55 to 4·8 inch; wing 1·93 to 1·95; tail 2·14 to 2·33; tarsus ·77 to ·82; bill at front ·35; from gape ·46. The bill is excessively like that of *Melizophilus provincialis*; the wing also resembles that bird, except that the first primary is larger in proportion. Tail of similar form, but proportionately shorter; the outer feathers are ·35 shorter than the central ones.

Notwithstanding the differences I have noted, the general resemblance is so strong to *Melizophilus*, that I have placed it in that genus. The head is streaked and so are the throat and breast, but I have a Dartford Warbler with small white streaks on the throat. It would not be advisable, therefore, to create a generic term, merely because in mode of coloration it differs somewhat from *Melizophilus*.

It was discovered by Captain Cock, 30th P. N. Infantry, at Nausherah, in the Panjab, who says of the bird: "They are found in pairs among low stony hills, and are very restless, active little birds, and proportionately difficult to shoot."

The specimens I have from Captain Cock were killed in the beginning of February.

## LIBRARY.

The following additions have been made to the Library since the last meeting.

*Presentations.*

\*\*\* Names of Donors in Capitals.

Sitzungsberichte der Mathematisch-Physikalischen Classe, 1871, Heft I—II, und der Philosophisch-Philologischen und Historischen Classe, 1871, Heft I—IV, der K. Akademie der Wissenschaften zu München.—THE ROYAL ACADEMY OF SCIENCES, MUNICH.

Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften, Math.-Naturwissenschaftliche Classe, Band LXIII, Heft I—V, Philosophisch-Historische Classe, Band LXVI, Heft I—III; Archiv für Oesterreichische Geschichte, Band XLVII, Hefte I—II; Fontes Rerum Austriacarum, Oesterreichische Geschichts-Quellen, Band XXII—XXIV.—THE IMPERIAL ACADEMY OF SCIENCES, VIENNA.

Monatsbericht der Königlich Preussischen Akademie der Wissenschaften zu Berlin, November, 1871.—THE ROYAL PRUSSIAN ACADEMY OF SCIENCES, BERLIN.

Zeitschrift der Deutschen Morgenländischen Gesellschaft, Band XXV, Heft III:—THE GERMAN ORIENTAL SOCIETY, LEIPZIG.

Statistisk Arbog for Kongeriget Norge, af Dr. O. J. Broch, 1870, 1871; Nyt Magazin for Naturvidenskaberne, XVIII, 1—4; Forhandlinger i Videnskabs-Selskabet i Christiania, Aar 1869—1870; Den Norske Lods udgiven af den Geografiske Opmaalning, Hefte 8; Salbmagirje (Lappisk Salmebog), Professor J. A. Friis bokte; Christiania Omegans Phanerogamer Og Bregner med Angivelse af Deres udbredelse Samt en Indledning om Vegetationens afhængighed af underlaget af A. Blytt; Le Névé de Justedal et ses Glaciers par C. de Sene; Om Skurings maerker Glacial formationen og Terraser Samt om grundfjeldets og sparagmitfjeldets mægtighed i Norge, af Professor Theodor Kjerulf; Norges officielle Statistik udgiven i aaret 1870, Nos. 1—13.—THE ROYAL NORWEGIAN UNIVERSITY, CHRISTIANIA.

Anales del Museo Publico de Buenos Aires para dar a Conocer, los objetos de Historia Natural Nuevos o Poco Conocidos en este establecimiento por G. Burmeister, Entrega I—IX.—THE PUBLIC MUSEUM OF BUENOS AIRES.

Carcinologiske Bidrag til Norges Fauna af G. O. Sars, Hefte I.—THE ROYAL SOCIETY OF SCIENCES OF TRONDHJEM, NORWAY.

Sanskṛta Brahmanḍa Vivṛttil, by Brajasundara Maitra.—THE AUTHOR.

On the Study and Value of Chinese Botanical works, by E. Bretschneider.—THE AUTHOR.

The Rāmāyaṇa, edited by Hema Chandra, Vol. II, Part XIV.—THE EDITOR.



Zuma O la Scoptera della China della Contessa di Genlis, tradotta dal francese da Susanna Stefania D'Albiac; Opere del Padre Paolo, Vol. I; The New Testament in Russian; On the Management of Infants, I, in Gujrati; Praváda Málá by the Rev. J. Long; Life of George Stephenson, by V. Krishnamachariar; La Grammaire selon L'Academie, par Bonneau et Lucan; The Proverbs of Solomon, in Hebrew, in Irish and in English; Proverbs of Solomon in Malayalam Metre by M. J. Cochoocoonjoo; Peeps into Social life in Calcutta, a century ago, by Rev. J. Long; A Practical Grammar of the Dutch Language, by R. Van Der Pyl.—REV. J. LONG.

Botanologia. The English Herbal, or History of Plants by W. Salmon, M. D.—The British Herbal. An History of Plants and Trees, by J. Hill, M. D.—Theatrum Botanicum. The Theatre of Plants.—COL. A. S. ALLAN.

The Travels of a Hindu by Bholanauth Chunder; Vols. I—II.—GOVERNMENT OF INDIA, HOME DEPARTMENT.

Annual Report on the Administration of the Territories under the Lieut.-Governor of Bengal during 1870-71.—GOVERNMENT OF BENGAL.

Report on the Administration of the N. W. Provinces for 1870-71. GOVERNMENT OF THE N. W. PROVINCES.

Records of the Geological Survey of India, Vol. V, Part I.—GEOLOGICAL SURVEY OFFICE.

#### *Exchange.*

'Nature,' Nos. 120—122.

'Athenæum,' January 1872.

#### *Purchase.*

Annals and Magazine of Natural History, No. 49;—American Journal of Science, Nos. 12, 13;—Edinburgh Review, January 1872;—Revue des deux Mondes, January 1871;—Journal des Savants, December 1871;—Comptes Rendus, Nos. 1—2.

PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR MAY, 1872.

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The monthly meeting of the Society, was held on Wednesday, the 1st instant, at 9 o'clock p. m.

T. Oldham, LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were announced :

1. From Col. J. C. Haughton, C. S. I.—Eleven silver coins.

Mr. Blochmann observed that these coins all belong to old Bengal kings. They have all been described. Four belong to Ghiásuddin Bahádur Sháh, from the Lak'hnaúti Mint. The years are unfortunately cut away. Three belong to Fakhruddin Mubárák Sháh, and were struck A. H. 744 at Sunnár-gáon, the legend and the margins being clear. Four belong to Shamsuddin Abul Muzaffar Ilyás Sháh, and were struck at the Firúzábád Mint.

2. From L. Schwendler, Esq.—A copy of 'Instructions for testing telegraph lines and technical arrangements in office.'

3. From Dr. Durrant.—An African MS. found at the confluence of the Tshadda and the Niger.

It is an incomplete Arabic Prayer-book in North African characters.

The following gentlemen duly proposed and seconded at the last meeting were balloted for, and elected *Ordinary Members*.

W. Heilgers, Esq.

Bábu Mahimáchandra Chakravarti, Burranaggúr.

Bábu Niranjana Mukerji.

Professor G. B. Airy, Astronomer Royal and President of the Royal Society, proposed by the Council at the last meeting, was elected an *Honorary Member*.

The following are candidates for ballot at the next meeting.

Lieut. J. H. Bourne, Shillong, proposed by Dr. T. Oldham, seconded by Dr. J. Anderson.

W. E. Brooks, Esq., C. E., Etawah, proposed by Dr. F. Stoliczka, seconded by H. F. Blanford, Esq.

A. Anderson, Esq., Futteghur (for re-election), proposed by Dr. J. Anderson, seconded by Dr. F. Stoliczka.

Capt. M. H. Court, A. D. C. of H. E. the Commander-in-Chief, proposed by the President, seconded by Col. H. Hyde.

The Council recommended that Professor Thomas Huxley be elected an *Honorary Member* of the Society, in appreciation of the great services which Professor Huxley has rendered to Natural history by his very numerous original researches, and his truly philosophical treatment of the homologies in the various organisms, both recent and fossil, comprising the animal kingdom. They would also prominently notice Professor Huxley's services in treating Natural History Science as an essential part of every man's general education.

The Council have elected Col. H. Hyde, a member of the Finance Committee, and Capt. J. Waterhouse, a member of Council in the place of Col. Tennant.

The Hon'ble W. Markby intimated his resignation as member of the Society, and Mr. W. C. Ayrton resigned on leaving India.

The following papers were read—

I.—*Monograph of Indian Cyprinidæ*, Part V,—by Surgeon F. DAY.

This is the concluding portion of Dr. Day's detailed descriptions of Indian *Cyprinidæ*; it includes the *Gobitinae*. The next part will contain additions to the previous parts, and will also treat of the geographical distribution of the entire family as represented in Indian waters.

II.—*Note on a few species of Burmese birds*,—by A. O. HUME, C. B.

(Received 22nd April, 1872.)

Amongst a small collection of birds sent me from Thayet-myo, and which I owe to the kindness of Capt. Fielden, 21st Hussars, I find two species which I have never yet seen, and which, though possibly well known, appear to me to be new. The first is a merlin, a wonderful link between *Lithofalco Esalon* and *Chiquera typus*, Bon., and supposing it to be new, I propose for it the name of

*Lithofalco Fieldeni*, or Fielden's Merlin.

In both sexes the mantle is dark ashy blue (darkest in the female), and the rump and upper tail coverts pure white. Central tail feathers black, with a few white spots, laterals white, broadly barred with black. Quills

blackish brown, or black (the later, secondaries and tertiaries, more or less tinged slaty) with a few small white spots on the outer webs, and numerous broad white bars on the inner webs. The chin, throat and whole lower surface, including wing lining, white, some of the feathers of the throat with narrow central brown shaft stripes, and those of the sides and upper abdomen with broad grey brown dashes. Forehead, lores and feathers round the eye, greyish white with dark shafts, rest of the top, back and sides of the head, and upper back, *in the male*, pale slaty blue (each feather with a linear dark shaft stripe,) with traces of an albescent nuchal half collar, *in the female*, rich chestnut, extending in some specimens on to the shoulder of the wing. This extraordinary difference between the males and females puzzles me greatly, but Capt. Fielden has marked the sexes, and I have no reason to doubt his accuracy.

The legs, feet, cere, gape, are all bright yellow, the bill and claws blackish horny.

The dimensions taken from the dry skin are :—

*Female.* Length from 11 to 12 inches ; wing 5·6 ; tail 5·5 ; tarsus 1·45.

*Male.* Length 10 to 11 ; wing 5·3 ; tail, 5 ; tarsus, 1·3 inch.

The other species is a *Micropternus*, distinct, it seems to me from *phaiiceps*, *gularis* and *badius*, but most nearly allied to the former. As compared with *phaiiceps*, the head is less brown, the pale margins of the throat feathers are broader and more conspicuous, the general colour is brighter and the bird is somewhat larger. I am in doubt as to whether this race merits specific separation ; should it be held to do so, it may stand as *M. Barmanicus*.

From this same collection I find that *Hierococcyx strenuus* (Gould) inhabits Thayetmyo, (Gould gives it from Manilla), and that *Picus pectoralis*, Blyth, the habitat of which was unknown to Blyth, also belongs to this locality. This latter species is very close to *Picus analis*, and is stated by Jerdon to be identical with it, (Ibis, 1872, p. 7).

### III.—Notes on the Reptilian and Amphibian Fauna of Kachh,—

by DR. F. STOLICZKA.

[Received 27th March, 1872.]

A recent official visit to one of the most eastern of our feudatory provinces gave me an opportunity of collecting a few notes on some interesting species of Reptiles. The Province of Kachh lies South-east of Sind, between the eastern branches of the Indus and Kathiwar, being separated from the neighbouring countries by the Run, formerly a branch of the sea, but now mostly covered with a saline efflorescence, being only locally during the rainy season inundated. Thus isolated, Kachh, with a few of the Run-islands, forms a small geographical province by itself, but practically its fauna is of the desert

type, like that of Sind, Southern Panjāb and Kāthiwar. Consequently I shall have to notice several forms of purely African character, which are quite foreign to our eastern provinces, like Bengal.

Of some of the physical peculiarities of the country, I shall speak on another occasion, in connexion with the avifauna of the province. I have at present only to notice that nearly all the species, placed on record, had been collected in the northern, moderately hilly part of Kachh, and along the Run, where locally a somewhat richer vegetation exists. But few species were met with along the sea coast near Mandavi, and these agree with Bengal forms, such as *Tiliqua carinata* and *macularia*, &c. The collection was made between November and February, in the cold and dry, and consequently very unfavourable, season for the existence of many reptilian or amphibian forms. This will explain the comparatively small number of species noticed; for I have little doubt that the number might easily be doubled, if a careful collection were made during the rainy season. At that time, I heard, snakes for instance, are very abundant and in great variety, while during the winter I have met with hardly more than half a dozen. Of *Batrachia* actually only *Rana cyanophlyetis* was common. Of *Testudinata* a species of *Emyda* is common in tanks, &c., and a small *Testudo*, very like *T. Grayi*, Günther, is very rare. Among the *Sauria* I obtained, however, several interesting and very rare forms, such as the new genus *Blepharosteres*, *Brachysaura ornata*, a new *Gymnodactylus*, &c. A species of *Crocodylus* occurs in the brackish streams, but I have not succeeded in getting a specimen.

The characteristic species of the Reptilian fauna of Kachh are: *Ophiops Jerdoni*, *Gymnops microlepis*, *Sitana Ponticeriana*, *Calotes versicolor*, *Uromastix Hardwickii*, *Hemidactylus maculatus*, *Gymnodactylus Kachhensis*, *Zamenis diadema*, and *Echis carinata*. These are the only common species during the cold season, and I would draw special attention to two or three of them.

*Gymnops microlepis*, Blf., was up to the present time known from the solitary type found at Korba in the Central Provinces, and a few other specimens were found by me at Kuhurbali in West Bengal. In Kachh, it is hardly possible to move a step without meeting this lizard. We are, therefore, justified to regard this part of the country as its head-quarters, and further to suspect that its geographical distribution is gradually extending into India.—Again, *Brachysaura ornata* was named from a single specimen, found nearly twenty years ago by Jerdon at Saugor, Central India, and all efforts on the part of Dr. Jerdon, and others, to re-discover this remarkable form failed, until I met with several specimens in Kachh; thus its head-quarters appear to be westward.—*Hemidactylus Kachhensis* has its nearest allies in *H. scaber* and *Kotchyii*, which are African and Persian forms. Excepting *G. triedrus* of Ceylon there is not

one *Gymnodactylus* of that type known from the eastern parts of India ; it is, therefore, very probable that these forms have come from the West.—*Uromastix* is an entirely African, or western, form, but penetrated as far eastward as the Ganges, and so did *Sitana Ponticeriana*, at the same time spreading into South India.—The new generic form *Blepharosteres* can only be compared with the eastern European *Ablepharus*.—*Zamenis diadema* has its headquarters in Arabia, Persia, and Sind.—The deadly *Echis carinata* and *Psammosaurus scincus* claim W. Africa as their home.

Without accumulating examples, I think, the idea recommends itself, that animals have preceded men in their wanderings from the West to the East. However, it must be borne in mind that all these forms proceeded eastward only as long they found suitable physical conditions and suitable climate.

## SAURIA.

### VARANIDÆ.

#### 1. VARANUS DRACÆNA, L.

Not common, but occurring throughout Kachh. Young and adults have 90 to 100 transverse rows of shields between gular fold and groin. The adult (up to 5 feet in length) lives in narrow crevices of rocks, while the young is more often seen near houses. The latter is extremely variable in colour: grey, or dark brown, with numerous irregular, narrow, black cross bands and streaks, or rows of dark spots, with interspersed yellow spots or rosetts, arranged in more or less regular transverse series; tail towards the end tinged bright yellow, or orange red. There is a conspicuous dark stripe from the eye to above the ear; chin more or less distinctly dark banded. All these markings are more or less indistinct, or become even obsolete, in the adult, except the dark stripe behind the eye. The scales on the upper neck generally have distinct rounded tubercles on them. The species appears to be almost quite as much terrestrial in its habitat, as the next.

#### 2. VARANUS (PSAMMOSAURUS) SCINCUS, Merrem.

*V. griseus*, Dand.—*V. arenarius*, Geoff.—*V. ornatus*, Carleyle, J. A. S. B., xxxviii. Pt. ii, 1869, p. 192.—Jerdon, Proc. A. S. B., 1870, p. 71.

Somewhat rare, occasionally seen near villages.—Both this and the young of the former species, which are not very dissimilar in colouration, are throughout Western India known under the name of *Bis-cobra* or *Chanden-gô*. They are dreaded by Natives and Europeans alike, who believe their bite to be deadly, for which there is of course no reason to be assigned, unless it should happen that the animal gets very excited, and then its saliva may possibly become poisonous. But natives often died, not because they were bitten by a really poisonous reptile, but because they firmly believe that the reptile was a poisonous one.

## LACERTIDÆ.

3. *GYMNOPS MICROLEPIS*, Blf.

Comp. Journ. A. S. B., vol. xli, 1872, p. 90.

An extremely common species throughout Kachh, frequenting sandy and moderately rocky ground between low brushwood. The largest specimen measures 8 inches. I have examined hundreds of specimens, and never noticed any essential variations in structure or colour from the typical form, described by Blanford.

4. *OPHIOPS JERDONT*, Blyth.

Not common, but generally distributed throughout Kachh. I have noted the variations of this species in another paper (Journ. A. S. B. vol. xli, 1872 p. 89). The form which inhabits Kachh is, like the one from the Panjâb, generally smaller, and is also a little more slender,\* than that found on the continent of India, North of Agra, but there is not the least difference in structure and coloration of the two. Some specimens have only 5 or 6 femoral pores on either side of the thigh, and they are rather widely separated in the preanal region, but this is evidently a character variable with age and sex. The largest specimen measures 4 inches, the body being nearly 1.25 inches.

## SCINCIDÆ.

*BLEPHAROSTERES*, n. gen.

Body slender, covered with smooth scales; head-shields as regular as in *Mocoo*; nostril in a single shield, lateral; without a trace of an eyelid and without external ear; no teeth on the palate and the palatal notch situated behind the level of the eye; feet short, each with five toes, denticulate below; claws small.

This genus belongs to the Gymnophthalmous division of the Scinc family, but differs from most of them by the total absence of an external ear. It may, in short, be characterised as a *Mocoo* without eyelids and ears.

5. *BLEPHAROSTERES GRAYANUS*, n. sp.

Body slender, shorter than the tail, moderately depressed. Snout obtuse; rostral reaches the top of head and is broader than high; anterior frontal single, hexagonal, broadly in contact with the rostral, but narrowly with the vertical; posterior frontals separated, each a little smaller than the anterior frontal, and in contact with a small shield on the upper anterior angle of the eye; vertical elongate, subquadrangular, the posterior sides the longer ones; three superciliary shields, followed by two small ones, obliquely descending on the temporal region; anterior occipital single, pentagonal, pointed in front, and behind forming a suture with the small suboval median

\* The number of scales round the body being, therefore, generally only 26 to 28, rarely 30.

occipital, behind which the two elongated post-occipitals also form a suture; nasal single, lateral, followed by a postnasal; one elongately quadrangular loreal; two rows of small shields round the anterior upper and posterior edge of the eye; one small postocular, followed a little higher up by a large temporal, in contact with the last upper labial and the post-occipital; a few enlarged shields behind the occipitals; 18-20 longitudinal rows of scales round the middle of the body, and 36—38 transverse rows between the fore and hind limb; 7 upper labials, the 5th longest, under the eye, the last highest; 6 lower labials; first chin-shield single, followed by 3 pairs, of which only the first forms a suture; two preanal shields enlarged; subcaudals in one row, enlarged, and very numerous. The fore limb when laid forward reaches the angle of the mouth, and the hind-limb is three fifths the distance between it and the fore-limb.

*Colour*, above, olive green, with a very distinct metallic lustre, a little darker at the sides, speckled with black and gradually passing into the uniform greenish white lower side; shields on head with faint dark markings; a silvery green narrow band passes from the superciliary edge to the base of the tail, it is edged with black below, but gradually lost on the tail, which is paler than the body and with a pink tinge. Limbs brown above, marked with rows of white spots; lower portions of upper labials white.

The larger of two specimens measures: total length 2·8 inch., head and body 1·25; tail 1·65, reproduced at tip; fore-limb 0·3, hind-limb 0·45 inches.

I procured the only two specimens on a sandy place between tufts of grass in the Waggur district, in the North-eastern part of Kachh.

I have great pleasure in connecting with this interesting new form the name of our veteran herpetologist Dr. J. E. Gray.

6-7. *EUPREPES* [*TILIQUA*] *CARINATUS* and *MACULARIUS*.

(Comp. J. A. S. B., xli, Pt. II, 1872, p. 117.)

Both occur but rarely, except along the sea coast, particularly among palm groves. The first named species grows to 12 inches, the scales are three-keeled, and the coloration typical, with yellowish white edges to the back.

In *T. macularia* the scales are mostly seven-keeled, the colour is uniform olive brown, with or without dark spots, the sides pale olive with a few white spots on neck, or they are throughout black and white dotted, the stripes at the side of the tail are, however, always well marked; below pale yellowish white. The largest specimen observed only measures 5 inches. which is the usual size of Central Indian specimens.

8. *EUMECES TENIOLATUS* (Blyth).

*Mabowia teniolata*, Bl., apud Anderson, Proc. A. S. B., 1871, p. 184.

I procured two live specimens of this very rare lizard at the little village Urira in North-western Kachh. The structure entirely agrees with the very detailed description given by Anderson, only in one of the specimens the fore-



limb, when laid forward, does not quite reach the anterior angle of the eye, while the length of the hind-limb is very nearly one half the distance between it and the fore-limb; total length 7 inches, head and body together being just half of it. The colour is pale fulvous brown, above minutely speckled with dark and tinged with olive on the head; a dark brown central band originating at top of head and continuing to the root of the tail is irregularly speckled with yellowish white; a second dark brown band originates behind the nasal and extends along each side of the body to the groin, it is spotted with white and gradually fades towards the belly; lower side yellowish, with a distinct yellow tinge on the throat, on the sides of the belly, about the hind limbs and the root of the tail; labials white with dark sutures; limbs above pale brown and spotted with white; tail speckled with dark at the sides.

The other specimen measures  $8\frac{1}{2}$  inch., the body being  $3\frac{1}{4}$ . Its colour is quite similar to the first, but of darker hue on the back, and the tail is dark spotted above, and at the sides. A third specimen, besides the two types in the Museum, was collected by Dr. Jerdon in Northern Panjáb.

#### SEPSIDÆ.

##### 9. SPHENOCEPHALUS TRIDACTYLUS, Blyth.

Journ. A. S. B., xxii, 654.—Günther, I R., 98.—Jerdon, Proc. A. S. B., 1870, 74.

Not common. In Blyth's description, it should be noted that the inner toe on each limb is the shortest; on the fore-limb the two outer ones are subequal, but on the hind-limb the outer is conspicuously longer than the median one. Scales in 20 longitudinal rows round the middle of the body, and in about 82 transverse rows between fore and hind-limb. *Head-shields*: rostral triangular, the supranasals form a suture behind it, and there is a small postnasal present, in contact with second labial; anterior frontal septagonal; posterior frontals separated from each other, irregularly five-sided, much pointed behind; vertical large, sub-quadrilateral, forming a short straight suture with the anterior frontal and a waved one with the somewhat smaller occipital, which is subtriangular, narrowed posteriorly and rounded at the end; there is no loreal present, but one elongated anteocular, two or three small supra-oculars, one elongated narrow infra-ocular and two squarish post-oculars, followed by three largish temporals, the lowest in contact with the last labial; eye very small, lower eyelid transparent; six upper labials, 1st very small, 5th largest, below the eye, sometimes split in two shields; six narrow lower labials gradually increasing in length; inferior rostral rounded behind, followed by two single chin-shields, of which the second is more than twice the size of the first and obtusely pointed behind, and there are four pairs of enlarged chin-shields besides. A pair of enlarged preanal shields. Subcaudals moderately large.

Pale brown, darker above, and each scale generally with a blackish dot; head, above, and feet distinctly yellow, and the pale whitish underside more or less tinged with yellow. Length of a specimen 4·5, head and body being 2·9; fore-limb 0·25, hind-limb 0·6 inches.

#### AGAMIDÆ.

##### 10. SITANA PONTICERIANA.

Comp. J. A. S. B., 1872, xli, p. 108.

I refer under this name to the species with unequal scales on the side of the body. It is very common between low brushwood throughout Kachh.

The specimens perfectly agree in structure and colour with those from Central India, N. W. Provinces and the Panjáb, and I also got similar specimens in the Dakhin at Púna. My largest specimen (out of several hundreds of all sizes) measures 7·5 inches, of which head and body are only two. The hind leg sometimes only extends a little beyond the eye, in other specimens it reaches somewhat beyond the snout, but in the young often half an inch beyond it. Not in a single specimen does the fore-limb reach the vent, generally only to the groin, when laid back.

##### 11. CALOTES VERSICOLOR, (I. R., p. 140).

Very common, and the only species of this genus I met with. As usually, the colours are very variable. In full grown specimens (about 15·16 inches) the scales at the side of the body are often twice as wide as those on the belly, and the keels become nearly obsolete on the former.

Large specimens are usually fulvous brown, on the anterior part of the body tinged with red; the posterior part has blackish confluent spots, which are also well marked on the tail; throat reddish, neck below and at the sides bluish, lips often blackish; cheeks very much swollen, as in *Charasia*.

##### 12. BRACHYSAURA ORNATA, Blyth.

Journ. A. S. B., xxv, p. 448.—Günther, Ind. Rept., p. 161.

Jerdon, Proc. A. S. B., 1870, p. 78.

Blyth's description of this remarkable lizard,\* though brief, is so characteristic, that the species could hardly be mistaken for anything else. I have obtained five specimens of various sizes.

Exactly as Blyth says, it is a *Calotes* with enormous head, this being short and blunt, moderately concave above, with the superciliary ridges strongly projecting; body stout and thick, tail thick at base, rapidly attenuating towards the end, shorter or equal in length to the body.

Head above covered with largish, irregular, keeled shields, a roset-like group of slightly larger ones being noticeable in the middle of the occiput, and two other similar groups are placed little posteriorly on either side; two groups of spines above the tympanum, each with one principal spine; some en-

\* The only type specimen appears to have been lost.

larged keeled scales at the side of the head, between the eye and the ear, one particularly large one being conspicuous near the upper anterior edge of the tympanum, which is large, obliquely oval, but without any other spines at its edge; nostrils lateral, in a single shield. All scales keeled, those of the back larger than those of the belly, the difference in size being, however, much less apparent in the young than it is in the adult; in the latter the keels become almost obsolete on the lower side. A distinct nuchal crest is present; it is composed of single laminae, and is continued to the base of the tail as a low crest of sharply carinated and pointed, but not enlarged scales. The latter are imbricated on the body, their points being directed backwards and upwards; and they are arranged in oblique transverse series, about 45 of them being in one row between fore and hind-limb; 54-58 longitudinal series round the middle of the body. On the tail the scales are also imbricate, and are arranged in alternating longitudinal series. About 27 upper and as many lower labials, all finely but distinctly pitted. The upper rostral is small like the upper labials, and there are three or four rows of scales between the latter and the lower eyelid; the lower rostral is much larger, pentagonal, produced and pointed behind, and followed by several small shields. None of my specimens shew any enlarged femoral, or preanal, or subcaudal shields, and none have a trace of any kind of pores. Throat fold distinct, simple.

The young is olive or pinkish brown, with a dark brown band between the eyes, three spots on the snout and dark marblings on the side of the occiput; two subquadrangular spots on nape and neck, four on the back and three or four on the base of the tail, gradually passing into incomplete dark bands, of which there are about twelve. All the dark spots on head and back are margined with pinkish white, and the two spots on neck are bounded by two parallel white lines. Corresponding to the dorsal dark spots there is a row of similar spots at the side of the body, and the whole forms a sort of transverse band. Lips dark spotted; a bright yellowish oblique band from below the eye to the angle of the mouth; cheeks brown; extremities above brown banded. Below, yellowish white, spotted with dark and tinged with red on the chin and throat; gular fold bright reddish blue. In the adult the dark bands and spots are much less distinct, and sometimes almost entirely disappear, but many of the scales are distinctly yellowish, and the red colour on the chin is brighter.

	Total length.	Head.	Tail.	Fore-limb.	Hind-limb.
Young, .....	3.5	0.65	1.6	0.9	1.25
Adolescent, .....	4.65	0.75	2.25	1.15	1.50
Adult, .....	6.65	1.10	3.10	1.6	2.25

The fore-limb, when laid back, fully or very nearly reaches the groin, and the hind-limb, when laid forward, extends a little beyond the gular fold. The third and fourth fingers are subequal, but the fourth hind toe is one

third longer than the third. The claws are moderate, but much stronger on the fingers than on the toes, and all are blackish above,

This is a true ground lizard, sluggish in its habits. It often sits quietly on a stone, the head turned to one side and does not move unless forcibly pushed from its place; and even then it shews very little activity.

There is no doubt that the genus *Brachysaura* is most closely allied to *Trapelus*, agreeing with this in the general form of body and coloration, but differing from it by the occipital spines. In this respect it agrees with *Agama*, but has a stouter body and shorter tail, no longitudinal fold on the throat, and the edge of tympanum without any spines. However, it is difficult to say which species should be regarded as the type of *Agama*, and all the genera of the ground-*Agamidae* require a thorough revision. It only differs from *Calotes* by the stout, rather depressed, body, short tail, and by its terrestrial habits.

### GECKOTIDÆ

#### 13. HEMIDACTYLUS COCTEL. (Comp. J. A. S. B., xli, 1872, p. 198).

Tolerably common, both in houses and among crevices of rocks, throughout Kachh and the adjoining Run island.

#### 14. H. MACULATUS, (ibidem, p. 94).

Very common; colour ashy, or light brown, with darker spots.

#### 15. H. LESCHENAUULTII, (ibidem, p. 97).

I only obtained two specimens of this species in the Wagur district, and saw no others; it must be very rare.

#### 16. GYMNODACTYLUS KACHHENSIS, n. sp.

Head rather high, with the snout moderately produced and obtusely rounded; rostral longer than high, grooved above; nostrils lateral, directed upwards, immediately behind the rostral, and followed by three small shields; snout above covered with largish, subearinated shields; top and sides of head with small granular scales between which larger rounded ones are intermixed; body covered with 12-14 longitudinal rows of enlarged, trihedral, very sharply keeled tubercles, separated by two or three rows of small granular scales from each other, and each large tubercle is only little smaller than the opening of the ear. Tail rather depressed, verticillate, with six rows of large sharply keeled tubercles (none along the centre); limbs above also with large tubercles; 11-12 upper labials, the last two or three very small; eight or nine lower labials; inferior rostral large, posteriorly pointed; two pairs of enlarged chin-shields, followed by a row of conspicuously enlarged shields along the labials; scales on throat rounded, very small; those of the belly larger, in 28-30 longitudinal series and separated on either side from the upper tubercular region by about six rows of much smaller shields; 4-8 preanal pores in a curved, uninterrupted, series in the male, (no femoral pores

present), subcaudals two rowed, slightly enlarged and somewhat irregularly alternating. Toes long and slender, the two last joints separated from the preceding by a very marked thickening, provided with two thickened transverse lamellæ on the lower side.

*Colour*, above, ashy grey, indistinctly marbled with dark on the head; 8-10 transverse dark bands on the body, composed of more or less confluent spots, and alternating in breadth, the first band on the neck is curved backwards, and is the continuation of a short dark stripe originating at the posterior edge of the eye; tail above with about twelve or fourteen dark bands. It often occurs that these dark bands are not well defined, except on the tail; in some specimens only five bands or rows of spots are seen on the body, and in many they are entirely absent, the colour being quite uniform ashy. Lips dark spotted. Below, uniform whitish, tinged with yellow on the posterior half of the body. Young specimens are dark brown, minutely speckled with white, or pinkish.

The fore-limb does not reach the groin, when laid back, but extends to the tip of snout, when laid forward; and the hind-limb reaches the ear. The usual size of full grown specimens is about 4 inches, head and body being 1.7 and tail 2.3 inches.

Common throughout Kachh, mostly in crevices of rocks, and very rarely seen in houses.

The species is evidently closely allied to the Ceylonese *G. triedrus*, Günther (Ind. Rept. p. 113), but differs from it by the presence of preanal pores, the distinct thickenings at the base of the two terminal joints of the toes, and by its colouration.

Another species with which it can be compared is the African *G. scaber*, or *geckoides*,\* but judging from Dum. and Bibron's description of that species,

\* The Panjáb form which has been found by Theobald, and which he and Blyth (J. A. S. B., xxii, 410) quote under the name of *G. geckoides*, the latter adding 'perhaps a new species,' is no doubt distinct from the African form, but it is to all appearance identical with *G. caspius*. In general character it is allied to *Kachhensis*, but the shields on the top and sides of head are coarser and carinated, the enlarged tubercles on the body larger and closer together, in about 12 longitudinal series, separated by one or two rows of minute granular scales, and each of the trihedral tubercles is as large as the opening of the ear; tail verticillate, above with similar sharply keeled tubercles; a row of enlarged subcaudals; about eleven upper and eight to nine lower labials; two pairs of enlarged chin-shields, 18-20 longitudinal rows of scales across the body, with several rows of small scales at the sides; 32-34 femoral pores, continuous in the preanal region. The fore-limb reaches to half the length of the snout, or the end of it, and the hind-limb is somewhat more than half the length of head and body. The colour resembles *Kachhensis*, there being five or six indistinct transverse rows of dark brown spots on the upper side. All the specimens in the Museum are very much shrunk, but I can see no essential distinction between them and the description and figure given by Eichwald of his *G. caspius* in Nouv. Mem. Soc. Moscow &c., tome VII, 1841, p. 114, pl. xv, and also

and the few existing, rather imperfect, figures, the Kachh form is to be distinguished by having the trihedral tubercles on the back smaller, the limbs shorter, the subcaudals two rowed and only moderately enlarged.

A third very closely allied form is the Western Asiatic *G. Kotschyi*, Steindachner (Sitzb. Akad. Wien, M. N. Klasse, lxii, 1870, p. 329). According to the description and figure of this species, the Kachh form differs by its slenderer and more depressed form, a slightly longer snout which is covered with rather large sharpened tubercles, by slenderer and longer limbs, a greater number of labials, two rowed subcaudals &c.

#### UROMASTICIDÆ.

##### 17. UROMASTIX HARDWICKII, Gray.

Günther, Ind. Rep. p. 155.

Common in open sandy localities.

Not only the snout is covered with shields, but as a rule also the head above, between the eyes and the anterior part of the occiput.

The general colour is yellowish, with cinereous ill-defined spots and a dense irregular reticulation of brown; a few blackish streaks radiate from the eye, and a short streak proceeds from the angle of the mouth to the base of the ear; below, yellowish white, chin and throat and the sides of the lower head generally with irregular dark spots and stripes; a bluish black spot on the inner side of the femora appears to be always present. The largest specimen measures 15 inches, the body being 9 inches, (head alone 1), tail 6, fore foot to tip of claws 2.5; hind foot 3.75; free portion of fourth toe 0.9 inches.

There is a particular class of people employed in catching these reptiles, which are by some inhabitants esteemed as an article of food. The animals live in holes and are herbivorous, as noted by Theobald. (Comp. Cat. Rept. Asiat. Soc. Mus., p. 29). There are several interesting points in their anatomy, and I trust to have an early opportunity in noticing these.

#### CHAMELEONTIDÆ.

##### 18. CHAMELEO CEYLONICUS, Laur.

With regard to some peculiarities in the structure of the Indian *Chameleon*, I refer to my note in Proc. Asiat. Soc. B., for 1870, p. 1. The specimens found in Kachh entirely agree in this respect with those found on the Continent of India. The species is not common, on account of the scarcity of vegetation in Kachh generally. I met with it only on a few places along the Run, (at Jora, Sumrasir and Lodai).

In one specimen which I kept for some time alive, I have noted the following variations of colour. When the animal was undisturbed, the from the account in Dumeril's Cat. Rept. Mus. Hist. Nat. Paris. p. 45. Eichwald's figure gives only one pair of enlarged chinsields.

general colour was green, brighter on the head and changing to brown about the eyes, yellowish at the sides of the belly. Several dark yellow streaks radiated from the eye; of two streaks, originating at the hind-edge of the eye, the upper proceeded to the posterior end of the crest, and there was also a yellow streak from the lower edge of the eye very conspicuous; numerous small yellow spots on the back, extending on the sides; from neck to sacral region were eight transverse pale greenish bands visible, edged with bright yellow, and alternating with several whitish, irregularly placed, spots at the sides; tail with indistinct transverse bands; labials from below the eye to the angle of the mouth whitish; lower crest pure white. I have not noticed any longitudinal lateral bands. This colouration clearly exhibits some differences from the one generally given of the African *Ch. vulgaris*, and I am inclined to retain the two as distinct species. One female, the body of which measures 5.5 and the tail 6.25 inches, had on 3rd November twenty-two eggs, each 0.8 of an inch long and a little more than 0.4 inch thick. Another female with the body 4.2 inch. had only eleven eggs. In spirits the general colour of the body turns in time to uniform grass green.

The chameleon is called *sásamba* by the natives.

#### OPHIDIA.

19. *TYPHILOPS BRAMINUS*, Daud. (see J. A. S. B., xl, 1871, p. 425).

20. *ZAMENIS VENTRIMACULATUS*, Gray, (Ind. Rept. p. 253).

Not a common species; it is found on the ground between brush-wood. The anterior frontals are in Kachh specimens generally considerably smaller than the posterior, and the ante-ocular does not always reach the vertical.

The very young snake (about 8 inches long) has the head remarkably pointed, the rostral shield being projecting in front and flattened above; the two pairs of frontals are nearly equal. In one specimen there are portions of the fourth and fifth labials detached, forming a third long ante- or rather sub-ocular. The back has along the centre a distinct yellowish white band, interrupted by somewhat broader blackish spots. The other dark spots are only indicated.

In the adult the bands on top of head are sometimes quite indistinct, and are represented by irregular marblings; the cross dark bands become less distinct on the posterior part of the body and entirely disappear on the tail; the dark spots at the sides of the ventrals are occasionally scarcely traceable, while the angle of the same shields is usually indicated by a thin dark line, and the colour between the two lines is bluish or pale ashy white, but it is pure white, or yellowish white, at the sides of the ventrals. In one specimen, measuring 36 inches, I count 208 ventrals and 118 subcaudals.

21. *ZAMENIS DIADEMA*, Schleg. (Ind. Rep. p. 252).

Common throughout Kachh, particularly about the towns and villages.

Dr. Tatham obtained specimens for me, measuring considerably over six feet in length. All the adults have 29 rows of scales, and the posterior frontals are sometimes altogether replaced by smaller shields. A male adult is really a beautiful snake when alive: bright pinkish red above, with brilliant bluish black marblings, and the head of the same colour, neck bright blood red above, more or less spotted with black; the whole of the under side coral red with more or less distinct dark marks, (Comp. Anderson in Proc. Z. S. for 1871, p. 174).

22. *PSAMMOPHIS CONDANURUS*, Merr.

Günther, Rept. Ind. p. 291.—Stoliczka, Jour., A. S. B., vol. xxxix, p. 96, and vol. xl, p. 438.

23. *PSAMMOPHIS LEITHII*, Günther, Proc. Z. S., 1869, p. 505.

Since the publication of my notes on *P. condanurus*, I have obtained two young specimens of the form described by Günther as *Leithii*. The nostril is distinctly between two shields. It appears to be a slenderer form than the Indian *condanurus*, but I am not certain that the characters are sufficiently constant, in order to retain the Western form as a distinct species.

I can point out three somewhat different types, but it yet remains to be seen whether they will prove to be distinct species, or mere varieties.

*a. Ps. condanurus.* Head moderately elongate; snout subconical; anterior frontal shields considerably narrowed anteriorly; vertical moderately contracted; loreal one and a half, or very nearly twice, as long as broad; the two nasal shields are above the nostril very often united; one, very rarely two, temporals in contact with the post-oculars.—The general colour is isabelline or greenish brown, with the yellowish bands beginning on the supraciliary region very narrow. I have examined specimens, identical in every respect, from South India, the N. W. Provinces at the base of the hills, Bengal and Barma.

*β. Ps. Leithii.* Head elongate, narrow; anterior frontals very small, barely half the size of the posterior; vertical narrow and very much contracted in the middle; nostril between two shields; loreal cuneiform, narrower in front, and its length slightly more than the height near the posterior edge; a single temporal in contact with the postoculars.—General colour olive brown, darker above than at the sides, with pinkish pale yellow bands; sides of neck very distinctly yellow. Chin, more or less spotted with blackish; median part of ventrals bright brownish yellow. This is known from Sind and Kachh. I met with it on the ground between low bushes.

*γ. Ps. condanurus*, (an *Sindanus*). Head shields, above, like in the last form; nasal between two shields; loreal very long, nearly equally high throughout, its length being somewhat more than double its height; generally nine labials present, the second and third being replaced by three shields; two temporals always in contact with the postoculars.—General colour pale olive brown, with the light bands very indistinct, being on the body only indicated



by alternating series of black dots which in the other forms separate the dark from the light coloration. The pale pinkish olive band on the supraciliary ridge is as broad as in *Leithii*, while the brown band through the eye is moderately narrow; lips and chin spotted with black. There is a double dark line on each side of the ventrals which are olive pink in the middle. In one specimen, measuring 44 inch., of which the tail is 13.25 inch, there are 188 ventrals and 111 sub-caudals. I found this variety in Kachh, and Dr. Day obtained it in Sind near Sakkar. One specimen from Sind had swallowed a large *Trap. megalonyx*.

24. *ERTX JOHNI*, (Ind. Rept. p. 334).

Common; nocturnal in its habit and feeding chiefly on worms. It is entirely confined to the low sandy parts of the country.

The young are often pale coral red, uniform or with indistinct dark confluent spots along the back, and 5-6 imperfect black bands towards the end of the body; much paler below. The old snakes are generally uniform reddish brown above, often with a lilac tinge. The tail in the adult becomes eroded and worn off naturally, (so as to resemble the head), not from mutilation by snake-charmers.

It is scarcely necessary to repeat that the capture of this desert species at 9800 feet in Sikkim by Messrs. Schlagintweit rests upon mere imagination.

25. *NAJA TRIPUDIANS*.

Said to be common during the rainy season, but I only saw it on two or three occasions during the winter months. A quite black variety occurs on Pacham and in the other Run islands.

26. *ECHIS CARINATA*, Schneid.

Dr. Günther noted the identity of the African *E. arenicola* with the Indian snake (Proc. Z. S., 1869, p. 502), about which there can, I think, be no doubt. Among a very large number of specimens I select three for measurement:

	Total length.	Scales round the body.	Ventrals.	Subcaudals.
Young,.....	10 inches,	30	171	38
Half grown,	15 "	32	168	30
Full grown,	24 "	33	169	21

The supraciliary edge is quite as often entire, as it is scaly.

The keels on the obliquely directed lateral scales are crenated, and the hissing noise of the snake is produced by rubbing these scales against each other (Comp. Fayrer in Calcutta Medical Gazette, for Decb. 1870, p. 241). The lateral semilunar white stripes form in adults a continuous undulating band.

The snake is extremely common all through Kachh, and although often found in houses, I scarcely heard of a single case of a bite which, as Dr. Fayrer (loc. cit. p. 241) has shewn, is fatal. I handled numerous specimens myself, having generally found them under stones, and they

required a great deal of irritation and disturbance, till they actually struck, though by their movements and hissing noise they were always ready to shew their fierceness. They are nocturnal in their habit, and almost exclusively feed on insects.

### BATRACHIA.

I have met with only four species :—

27. *RANA CYANOPHLYCTIS*, is generally distributed over the whole of Kachh; it is to be seen in almost every pool of fresh, and even partially brackish, water.

28. *RANA TIGRINA*, is much rarer. I only found it in a few secluded localities, such as hollows or caves along the banks of rivers. It is called *mendaḱ* which is, I think, the usual name for a frog.

29. *RANA LYMNOCCHARIS*, Boie, (= *gracilis*, Wiegman.) was only met with once at Mandavi, near the sea in a pool of water between palm trees.

30. *BUFO MELANOSTICTUS*; common.

### IV.—NOTES ON REPTILES, COLLECTED BY SURGEON F. DAY IN SIND,— by DR. F. STOLICZKA.

The Reptiles, which I shall notice in the following pages, were collected by Dr. Day on his recent tour\* in connection with the investigations regarding the fisheries in Sind. The country visited by Dr. Day lies chiefly along the right bank of the Indus between Karachi and Sakkar. At the latter place he was energetically assisted by the Civil Officer at the station, Mr. H. E. Watson. Although chiefly made at a rather unfavourable time of the year, the collection contains several very interesting species. Among the *Sauria* I may notice a new species of *Eremias*, the first as yet known from our Indian possessions; a second equally interesting species is Günther's *Trapelus megalonyx*, and a few others. Among the *Ophidia* I shall describe a new species of *Hydrophis*, and note some peculiarities in adult specimens of the rare *H. curtus*, both from Karachi. As regard several other species the record of accurate localities is important.

Among *Batrachia* the only frog in the collection is *R. cyanophlyctis*, some of the specimens measuring, however, fully three inches.

### SAURIA.

1. *VARANUS (PSAMMOSAURUS) SCINCUS*, Merr. Common.

2. *ACANTHODACTYLUS CANTORIS*, Günther.

For an account of the variations in structure and colour, I refer to Journ. A. S. B., vol. xli, 1872, p. 91. Most of the specimens, (though not all), collected by Dr. Day have a comparatively longer snout, than those from the N. W. Provinces and the Panjáb, but other variations are quite the same in

\* Between October and February, 1871-1872.

both. The nasals are usually very much swollen. The largest specimen measures 10 inches, the body being 3·2 inches; length of head 0·7 inches; breadth of same near its base very nearly 0·5 inches; fore-limb 1·2 inches; hind-limb very nearly 2 inches; fourth hind-toe 0·7 inches.

3. *EREMIAS* [*MESALINA*] *WATSONIANA*, n. sp.

Body and tail moderately slender and rather depressed throughout; shields of head smooth, or very slightly rugose. Rostral small, just reaching to the top of the head; nostril between an upper and lower nasal, followed by a third very small shield, all three are much swollen; anterior frontal single, hexagonal; a pair of posterior frontals forming a short suture; vertical bell-shaped, obtusely angular in front and with concave sides; supraciliaries two on each side, separated from the supraciliary edge by a row of small granules, and from the postfrontals by a small triangular shield situated near the canthus rostralis. A pair of anterior occipitals, each irregularly pentagonal, narrow anteriorly, and forming a suture; median occipital smaller than either of the anterior ones, ovately quadrangular, with the short anterior angle wedged in between the two anterior occipitals, followed by another little shield, separating the post-occipitals, each of which is irregularly triangular. Two loreals, the anterior one elongate and very narrow, the posterior larger and triangular, and may almost with equal propriety be taken as an ante-ocular. There are nine or ten upper labials, the fifth and sixth being largest and under the orbit; 7—9 lower labials, the fifth or sixth the largest, and followed by very much smaller shields; five pairs of chin-shields, the three first pairs forming a suture; the fourth pair is the largest. Ear spacious, its upper anterior edge provided with a long narrow shield.

Scales above and on the sides of the body granular, equal, convex, smooth, and arranged in transverse series, there being about 45 of them in one row round the middle of the body. Scales on the upper side of the extremities also small, but slightly keeled; those on the tarsi and on the anterior flanks of the feet enlarged and nearly smooth, while on the tail they are all enlarged, very sharply keeled and arranged in rings. The throat is covered with small, smooth scales; the belly with eight rows of enlarged, trapezoid shields, one row on either side being situated at the edge. Hinder side of femora with very small granular scales, lower side of tibiae with large ones; one very large preanal shield surrounded above and at the sides by a row of smaller shields; 12-15 femoral pores on each side of the thigh, narrowly separated in the preanal region; scales on the lower side of the basal portion of the tail smooth, but further on keeled.

The lower eyelid is covered with granules, except in the middle where there are some distinctly enlarged flat shields. Fold in front of the shoulder well developed, but less distinct on the lower side, and nearly obsolete in the middle; its lower edge has eight scales.

General colour, above, olive, with a slight brown tinge; head with some indistinct blackish marks; back with four alternating series of white spots, accompanied by blackish spots, the outer series on the edge of back being in both cases the better developed one; sides with one or two series of pale spots margined with blackish; both the white and dark series of spots have the inclination of forming continuous bands; hinder side of thigh with a blackish stripe, and the tail with irregular dark marks; the entire lower side uniform whitish with a greenish tinge.

Total length of a perfect specimen 6·5 inches, the body being 2·1 inches. In the largest specimen the body is nearly 2·5 inches long, and the head 0·6 inch. The fore-limb, when laid forward, reaches midway between the eye and nostril, very rarely as far as the latter; and the hind-limb reaches the shoulder-fold, or half way between it and the ear. The toes on the fore-limb are rather short, but those of the hind-limb long and slender; on both they are sharply keeled below. I have examined five specimens of this interesting form, all are similarly coloured.

The species belongs to the section of *Eremias* with the gular fold attached in the middle of the throat, and with one large preanal shield; this group has been designated *Mesalina* by Gray, but I hardly think that the characters are of such importance as would necessitate a generic separation; they are certainly variable in the different species of *Eremias*.

Externally, as regards structure, the present species only differs from *Gymnops*\* by the presence of lower eyelids, and from *Cabrila* by the small, granular, smooth scales. It is the first Indian species of *Eremias* known, and belongs to the desert fauna of the Panjáb Province. In coloration it closely resembles the Chinese *E. argus*,† Peters, but it is a more slender form, and shews a somewhat different arrangement in the head shields.

#### 4. *EUBLEPHARUS MACULARIUS*, (Blyth).

Anderson in Proc. Z. S., 1871, p. 163.

General coloration of adult pinkish yellow; a dark violet band on the neck, more or less extending on the head, two on the body, and a smaller one on sacral region; the whole of the upper side of the head and body marked besides with irregular blackish brown spots or marblings; tail similarly marbled, (reproduced, short, very stumpy, and not verticillate in the only specimen); sides of head and limbs above with smaller and fewer dark spots; below, uniform yellowish white.

This is, Dr. Day informs me, rather rare in Sind. He met with it only in one house at Shikarpúr. It is, he says, very fond of residing under a tatty that is kept wet during the hot weather. It is called *Hun-kun*, or

\* Compare *antea*, p. 74.

† See Steindachner in Sitzungsab. Akad. M. N. Klasse, Wien, lxii, 1870, p. 336; and also *Zootoca chalybeia*, Eichwald, Fauna Casp., pl. xi, figs. 1—3.

*bis-cobra* by the Europeans, and has the misfortune (in common with the *taktú*, *Gecko guttatus*, of Barma) of being believed to be very poisonous. Of course, there is not a shadow of truth in the different reports about causing death, but like the *taktú*, it is, I dare say, ready to inflict a severe bite to the aggressor.

In the young (the type of the species) the toes are comparatively longer, than in *E. Hardwickii*, but the adult does not appear to exhibit any difference in this character from the latter species. Total length 6·34 inches, head and body 4·64, head alone 1·2; fore-limb 1·44, hind-limb 1·65 inches.

5. *HEMIDACTYLUS COCTÆI*, D. and B.

Vide Jour. A. S. B., xli, p. 98.—Not common.

6. *EUMECES TENIOLATUS*, Blyth.

Apparently very rare, (antea, p. 75).

7. *SPINENOCEPHALUS TRIDACTYLUS*, Blyth.

Rare; (antea, p. 76).

8. *UROMASTIX HARDWICKII*, Gray.

Very common; (antea, p. 81).

9. *TRAPELUS MEGALONYX*, Günther (I. R., p. 159).

There are four specimens of this rare lizard in the collection from near Sakkar, two young, one half grown, and one adult male.

Dr. Günther's specimen, which he rightly supposed to be from Afganistan, was half grown, and there is very little to be added to the detailed description of the species.

The enlarged scales on the body in young and half grown specimens become very marked on account of their bright yellow colour, but their size is actually little larger than that of the other scales. All scales are keeled, above and below, and arranged in tolerably distinct transverse series. In the very young, there is a thin ridge of slightly enlarged scales below the eye conspicuous, and a row of distinctly enlarged, yellow scales between the eye and the ear; both these ridges become indistinct in the adult, which also in other respects considerably differs from the young. The upper edge of the ear is always well protected by overhanging spinous scales. In the adult male the posterior end of the supraciliary ridge is distinctly angular, though not spinous. All the scales on the back, from the nape to the tail, are considerably larger than those at the sides, and are provided with very sharp obliquely erect points; on the paratoids and the nape they form a cluster of sharply erect spines, there is, however, no trace of a nuchal or dorsal crest. On the belly the keels on the scales generally are much worn off.

The following figures will shew the variations in age:

	Total length.	Body.	Long. rows of scales round the body.	Transverse rows be- tween the limbs.
Young, .....	4 inches	1·5 inches	70	55
Half grown ♂	6    "	2·5   "	68	52
Adult ♂ ....	11   "	4       "	74	60

The hind leg, when laid forward, reaches the nostril in the young, and the anterior edge of the eye in the adult. Upper labials vary in number from 35 to 41, they are less numerous in the adult. Males have a row of six or eight pores on the preanal edge, imperfectly separated in the middle by one shield.

*Coloration*: The young is greenish olive grey, with a dark band between the eyes, a few irregular brown spots on the occiput, with six blackish transverse bands from neck to base of tail, each band having along the centre of the back a yellowish, black edged spot, and two or three smaller ones at the sides; limbs indistinctly banded; tail with about sixteen dark bands, the first few have a central pale spot like those on the back; throat-fold at the side bluish black; a dark band from eye to ear; upper labials dusky. Below, whitish with irregular longitudinal dark stripes.—In the adolescent form the general colour is greenish brown, the dark cross bands become less distinct, but the vertebral spots are well marked, all the slightly larger scales are bright yellowish.—The adult male is dark olive, very densely speckled with dark yellow, the transverse dark bands very indistinct, except on the tail, and there is no trace to be seen of the yellow vertebral spots; labials pale yellow, streak below eye indistinct; throat, breast and sides of belly bright bluish, tinged with purple, particularly at the sides of the throat.

#### OPHIIDIA.

##### 10. GONGYLOPHIS CONICUS, (Ind. Rept. p. 333).

This species frequents damp sandy localities among low vegetation, living during the day in holes or under stones, and feeding during the night chiefly on earthworms and nocturnal insects.—Apparently rare.

11. ERYX JOHNNI. Similar in habit to the last, but occurring in drier localities; it is called *Bimau* in Sind.—Common.

##### 12. ZAMENIS VENTRINACULATUS.

The specimens exactly agree with those noted from Kachhi, (antea, p. 82). The snake appears to be very common.

##### 13. PSAMMOPHIS CONDANURUS, (an SINDANUS).

Common in the Sakkar district; (antea, p. 83).

##### 14. NAJA TRIPUDIANS, MEIT.—Common.

##### 15. BUNGARUS CÆRULEUS, VAR. $\beta$ , apud Günther, I. R., p. 343.

The krait is called *Pioní*; the term, Dr. Day says, being derived from *pion*, to drink, as it is reputed by the natives to suck in, or drink, the breath of persons it finds asleep. It is a common snake.

16. ECHIS CARINATA, Schneid., known under the name of *Lúndí* (the female), or *kuppah* (the male), (see antea, p. 84).

##### 17. HYDROPHIS DAYANUS, n. sp.

Head short and stumpy in the young, a little more elongate in advanced age, distinct from neck, which gradually increases in thickness towards the

middle of the body. Rostral one-third broader than high ; each nasal somewhat larger than a frontal, which equals in size a supraorbital ; vertical hexagonal, obtusely angular in front and much elongated and pointed behind, smaller than either of the two occipitals ; one ante-, two post-oculars ; seven upper labials, the third and fourth enter the orbit, the fourth is sometimes split in two, the penultimate is small, and the last one minute ; temporals 2 + 3 + pl., the lower of the two anterior is only a detached portion of the labial ; lower rostral very small, triangular ; six lower labials, first three large, posterior three much smaller ; two pairs of subequal chin-shields, either both are in contact, or the posterior are separated by a small shield ; all the head shields above and at the sides are very minutely granulated. There are thirty-three series of somewhat elongate, subimbricate scales round the neck, but further one the scales become regularly hexagonal, a little higher than long, and are in 40-44 series round the middle of the body. There are 400-415 scales in a line between the angle of the mouth and the vent, and 52-56 in a longitudinal row along the tail, the terminal scale is moderately enlarged, but not forked. Each scale on the body has a minute central keel, and on the side of the tail the keels of the succeeding scales become continuous, forming thin ridges.

Ventral scales each with two short keels ; they are 328-334 in number, anteriorly twice as large as the adjoining scales, but posteriorly their size considerably decreases, and many of them become split in two shields. Two pairs of preanal scales, the outer twice as large as the inner.

Head olive blackish, tinged with red, brightest on the lower side, an  $\Omega$ -shaped vermilion mark on the top of head, composed of more or less isolated spots, the upper convexity rests on the frontals, the lateral branches run along the supraciliary edge, and the ends curve outward towards each angle of the mouth ; this vermilion mark becomes rather obsolete with age.

Of two specimens the smaller one is 23 inches, of which the tail is a little above two ; the body is moderately compressed, of almost equal height throughout, encircled with fifty-eight black rings, separated above, but united by a black line along the ventrals ; the rings are only slightly contracted at the middle of the sides, being separated by narrower yellow bands ; the tail has besides eight black rings, the terminal three or four confluent on the lower side, and the tip is entirely black.

Another more adult specimen is 27 inches, of which the tail is nearly 2.5 ; the body is in the middle twice as high as at the neck ; there are forty-six transverse blackish rings on the body, and six round the tail ; each ring is blackest along the back, contracted to nearly half its breadth at the middle of the sides, and from there to the broader base strongly tinged with yellow which is the general colour of the snake.

*Hab.*—Karachi ; in tidal waters.

This species is evidently closely allied to the New Guinean *H. Belcheri*, differing from it by the smaller number of scales on neck, the hexagonal ones on the body, keeled ventrals, and by its coloration. Another, as regards coloration almost identical, species is *H. tuberculata*, Anderson, (Journ. A. S. B., xl, p. 18), but it has, thirty-eight rows of scales round the neck, two keels in a line on each scale, and several keels on each ventral. The scales on the side of the body are also slightly more elongate, and there exists a noticeable difference in the arrangement of the labials, and the form of the head shields.

18. *HYDROPHIS CURTUS*, Shaw. (Günther, Rept. Ind. p. 379).

Two adult specimens, a male and a female, from near Karachi can not be separated from the above species :

	Total length. Inches.	Tail. Inches.	Rows of scales round neck.	Round the middle of body.	Scales between angle of mouth and vent.	Scales along the tail.	Ventrals.
♂	34.5	3.6	31	34	221	42	151
♀	33	3	33	36	235	55	200

The male has a somewhat stouter and higher body than the female ; the head is in both blunt and thick ; the occipitals divided into several small shields ; male with one postocular on one and two on the other side, female only with one postocular ; third and fourth labials enter the orbit ; the two pairs of chin-shields are separated from each other by several small shields. The scales are comparatively somewhat larger and fewer in the male, than they are in the female ; each scale has a small central tubercular keel, and of the ventrals each has two. In the female the keels on the lower side are only a little larger than on the upper, but in the male they become regularly spinous along the whole of the underside, largest on the ventrals, attaining on the median ones a length of one tenth of an inch.

The coloration is very similar in both sexes : head olive above, with a yellow band from the eye to the neck ; body in male with fifty, in the female with forty-eight transverse dark bands, separated by narrower yellow interspaces, more or less confluent along the back and tapering into a point towards the middle of the body ; lower part of sides and along the belly uniform yellowish white ; tail yellowish at base, dusky along the ridge, the terminal two-thirds of its length nearly entirely black.

The adult cannot be a very active snake, as the sides of the male are covered with a great number of small *Balani*. Dr. Günther's largest specimen was only 17 inches and the only authenticated locality is, he says, Madras. Dr. Fayrer records, (in Calcutta Mad. Gazette, Feb, 1871), a specimen from the the Orissa coast at Puri, and gives a description of the species on p. 22.

19. *ENHYDRINA VALAKADYEN*, Boie (= *Bengalensis*, Gray).

A specimen from Karachi has as many as forty-seven series of scales round the neck, and fifty-eight round the middle of the body, where they are hexagonal.



20. *PELAMIS PLATURUS*, L. (= *bicolor*, Schneid.). Karachi.

A young specimen is uniform yellow, tinged with dusky along the vertebral region; tail spotted and reticulated with black.

V.—OBSERVATIONS ON INDIAN BATRACHIA,—by DR. F. STOLICZKA.

The author referred to several interesting points in the similarity of the structure of various species, particularly in connection with their geographical distribution.

The paper will appear shortly.

At the conclusion of the meeting, the President invited the attention of the members to one of Mr. Schwendler's 'Insulator and Joint Detectors,' which had been manufactured on the principle explained before the Society in March, 1871.—(See Proceedings, 1871, p. 71).

Several of the members tested the apparatus, and satisfied themselves of its efficiency.

Mr. Schwendler stated that the instrument had already been introduced with the most gratifying results in India. One of the lines connecting Bombay and Surat contained so many defective insulators, as to reduce the insulation to about 0.5 Meg-Ohms per mile, and render through communication with Karachi extremely imperfect. It was tested by the detector, and about 3% of the insulators were rejected, the effect being that the insulation per mile was increased sixty fold, or raised to 30 Meg-Ohms per mile, as high an insulation resistance as can be expected from this line under existing circumstances.

Mr. Schwendler said he felt confident that this instrument would henceforth prove of the highest practical value in Telegraphy for maintaining the efficiency of Telegraph lines; and he was glad to be able to add that its portability and economy in use had been already acknowledged, and that the Italian Government had expressed their intention of introducing its use in Italy.

The President in laying before the meeting the first number of Part II, of the Journal for 1872, also drew the attention of the members to the slight alteration in the size which the Council have deemed advisable to adopt for the publications of the Society. He (the Pres.) thought that the increased size greatly improved the appearance of the Journal, and that it was particularly advantageous for the larger space allotted to the illustrations on the plates.

## LIBRARY.

The following additions have been made to the Library since the last meeting.

*Presentations.*

••• Names of Donors in Capitals.

Journal Asiatique, August, September, 1871.—ASIATIC SOCIETY OF PARIS.

Journal of the Chemical Society, November, December, 1871; and January 1872.—CHEMICAL SOCIETY OF LONDON.

Quarterly Journal of the Geological Society, No. 109, 1872.—GEOLOGICAL SOCIETY OF LONDON.

Journal of the Anthropological Institute of Great Britain and Ireland, January, 1872.—ANTHROPOLOGICAL INSTITUTE OF GREAT BRITAIN AND IRELAND.

Proceedings of the Royal Society, Vol. XX, Nos. 130, 131.—ROYAL SOCIETY.

Proceedings of the Royal Institution of Great Britain, Vol. VI, Part III, and IV.—ROYAL INSTITUTION OF GREAT BRITAIN.

Monatsberichte der Königlich Preussischen Akademie der Wissenschaften, Berlin, December, 1871.—ROYAL PRUSSIAN ACADEMY OF SCIENCES, BERLIN.

Bulletin de la Société de Géographie, January, 1872.—GEOGRAPHICAL SOCIETY OF PARIS.

Bulletin de la Société Impériale des Naturalistes de Moscou, No. I, et II, 1871.—IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW.

Bulletin de la Société d'Anthropologie de Paris, Tome V. (II Series). —ANTHROPOLOGICAL SOCIETY OF PARIS.

Journal of the Statistical Society of London, December, 1871.—STATISTICAL SOCIETY OF LONDON.

Bulletin de l'Académie Impériale des Sciences de St. Petersbourg Tome XVI. Mémoires de l'Académie Impériale des Sciences de St. Petersbourg Tome XVII, Nos. 1 to 10.—IMPERIAL ACADEMY OF SCIENCE OF ST. PETERSBOURG.

Christian Spectator, Nos. 10, 11.—THE EDITOR.

Calcutta Journal of Medicine, November, and December, 1871.—THE EDITOR.

Instructions for testing Telegraph lines and the technical arrangements in offices, by L. Schwendler, Esq.—THE AUTHOR.

Report of the Commissioners appointed to enquire into the origin, nature, &c., of Indian Cattle Plagues, with Appendices 1871,—GOVERNMENT OF INDIA, DEPARTMENT OF A. R. AND C.

Flora Sylvatica, by Major R. H. Beddome, Part XVII.—GOVERNMENT OF INDIA, DEPARTMENT OF A. R. AND C.

Ruins of the Nālander Monasteries at Burgāon, Sub-division Bihar, Zillah Patna, by A. A. Broadley, Esq.—GOVERNMENT OF BENGAL.

Report on the Land Revenue Administration of the Lower Provinces, 1870-71.—GOVERNMENT OF BENGAL.

Report on Meteorology, Museum, and Horticultural Gardens in the Province of Oudh, 1870-71.—GOVERNMENT OF BENGAL.

Report on the Administration of the Salt Department.—GOVERNMENT OF BENGAL.

Records of the Geological Survey of India, Vol. V, Part I.—GOVERNMENT OF BENGAL.

Memoirs of the Geological Survey of India, Vol. II, Part III.—GOVERNMENT OF BENGAL.

General Report of the Topographical Survey of India, by Col. H. L. Thuillier, R. A., F. R. S. &c., 1870-71.—SURVEYOR GENERAL'S DEPARTMENT.

*Exchange.*

Nature, Nos. 123-126.

Athenæum, February, 1872.

*Purchase.*

Annals and Magazine of Natural History, Nos. 50-51.—Revue des deux Mondes, 1st February, 15th February, and 1st March, 1872.—Journal des Savants, January, 1872.—Comptes Rendus, Nos. 3-8, 1872.—London, Edinburgh and Dublin Philosophical Magazine, Nos. 283, 284, 285.—Revue de Zoologie, Nos. 10-12, 1870, No. 1, 1871-72.—Revue Archeologique, No. 1, 1872.—Revue Linguistique, Tome Quatrieme, 3 Fasc.—Exotic Butterflies by W. C. Hewitson, Part 81, 1872.—Kamil of El-Mubarrad, Part VIII.—Fragmenta Historicorum Arabicorum, Tome II.—War with the South. A History of the great American Rebellion with Biographical Sketches of leading Statesmen and distinguished Naval and Military Commanders, &c., by Messrs. R. Toms, M. D. and B. G. Smith. Vols. I, II, III.

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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR JUNE, 1872.

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The monthly meeting of the Society, was held on Wednesday, the 5th instant, at 9 p. m.

T. Oldham, Esq., LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were announced :

1. From the Hon'ble A. Eden, Chief Commissioner of British Burma.—  
Eight pieces of tin coins found in the ruins of the old town of Tennasserim.
2. From Dr. C. F. Tonnerre, a specimen of Cobra.
3. From the Government of India, Home Department, a copy of Lieut. Col. Tennant's Report on the Total Solar Eclipse of December 11th, 12th, 1871.
4. From the Surveyor General's Office, two Photographs of Lushai Arms and Utensils.
5. From the Government of India, Papers regarding the rock inscriptions at Jogida Naugam in the Ganjam District.

The following gentlemen duly proposed and seconded at the last meeting were balloted for and elected Ordinary Members—

Lieutenant J. H. Bourne, Shillong.

W. E. Brooks, Esq., C. E., Assensole.

Captain M. H. Court, A. D. C., to H. E. the Commander-in-Chief.

A. Anderson, Esq., Futtelghur (re-election).

Professor T. Huxley, proposed by the Council at the last meeting, was elected an Honorary Member.

The following are candidates for ballot at the next meeting.—

Carr Stephen, Esq., Barrister-at-Law, Delhi, proposed by Mr. J. Delmerick, seconded by Mr. H. Blochmann.

Major W. S. Trevor, R. E., proposed by Col. H. Hyde, R. E., seconded by Dr. T. Oldham.

The Council announce that they have appointed Captain J. Waterhouse as General Secretary of the Society, Dr. Stoliczka and Mr. Blochmann continuing to act as Natural History and Philological Secretaries.

Captain A. J. Filgate, R. E. not having paid his admission fee under Rule 5, his election as member of the Society has become null and void.

Mr. W. G. Willson, officiating Meteorological Reporter, gave the following account of the occurrence of a whirlwind of unusual severity, attended with loss of life, in the neighbourhood of Calcutta.

Some days ago I received from the Bengal Government a copy of a very interesting report, by the Deputy Magistrate of Sâtckherah, of a whirlwind which occurred on the evening of the 25th of April, at 'Alipûr, a village about five miles to the south-west of Sâtckherah, which latter place is situated about forty-six miles east by north of Calcutta. The substance of the following account is taken from the report.

"The storm commenced about 6 P. M.; it was preceded by drizzling rain and hail, and lasted from about ten to fifteen minutes. The general direction of the storm's motion was from south-east to north-west. The wind did not blow from one quarter only, but appears to have assumed the character of a whirlwind, scattering thatches and trees in all directions. The inhabitants of the village considered it as *Bîrbatûs*, air troubled by the fighting of two giants, and they described it as a column of smoke rising towards the sky."

"The area affected by the storm was small, being only one particular quarter of the village, but during the fifteen minutes which it lasted, it blew away every hut and tree within its reach. During the great cyclones of recent years all the houses in a particular locality were not destroyed, some were left standing, but this whirlwind razed to the ground all the houses it touched. As an instance of the force of the wind, it is mentioned that a *dinghî*, capable of carrying fifty maunds, or more, which was lying in the Dhompôtha Khal, to the west of 'Alipûr village, was blown away along the ground for upwards of three hundred yards from the water's edge. The casualties caused by the storm were three persons killed and fifteen wounded; seventy-six huts destroyed and three head of cattle killed."

From the Bengal meteorological registers for the second half of April, I find that the trough of a considerably deep and long atmospheric wave, moving in a general direction from south-east to north-west, was passing over Lower Bengal on the evening of the 25th of April. The lowest barometric heights recorded at the following stations, for the half month, occurred, at

Akyab at 4 P. M. on the 24th, at Sagar Island and Calcutta at 4 P. M. on the 25th, at Jessore and Dhaká at 4 P. M. on the 26th. The trough of the wave was accompanied by great humidity, rain, low temperature and variable wind.

The whirlwind at 'Alipúr occurred when the trough of this atmospheric wave was passing, and it seems to have moved in the direction of the wave motion. Storms seem always to accompany the troughs of such atmospheric waves, and there is probably some connection between the direction of propagation of the wave, and the course of the centre of the storm which accompanies it.

Captain J. Waterhouse exhibited a series of sketches by Lieutenants Woodthorpe and Leach, R. E., illustrative of the Lushai country and its inhabitants.

The following papers were read—

1.—*On Beef in Ancient India.*—By BA'BU RA'JENDRALA'LA MITRA.

(Abstract.)

The paper opens with some quotations from different mediæval Sanskrit works in which beef is mentioned as an article of food. Some of these are remarkable. In one, a dramatic work, a scene occurs, in which two disciples of the great poet Válmíka discuss the cause of a bustle in their tutor's house, and of the destruction of some favourite calves which had been cut up for the entertainment of an honored guest. In another, an irate sage was about to depart from the house of his host, when he was tempted to remain as "the heifer was ready to be slaughtered, and the food was to be cooked in gñi." Passing from mediæval to ancient works, the paper treats at length of a number of rites which could not be celebrated without the slaughter of cattle. One of these is called *S'úlagava* or "spitted cow," i. e. roast beef. A second, the *Panchas'aradhiya*, required seventeen five-year-old, humpless, dwarf bulls, and a like number of three-year-old heifers for its celebration. A third, the *As'vamedha*, was celebrated with the immolation of one hundred and eighty animals, including horses, bulls, cows, sheep, goats, deer, and nilgáis. Then follow detailed accounts of the *Nirúdhá Pásubandha*, of the various kinds of cattle fit for sacrifice, of the manner in which sacrificed animals were cut up and distributed among the priests, and of the general rules followed in immolating cattle for sacrifice; as also of a summary process recommended when the "fatted calf" had to be slaughtered for the entertainment of guests. The concluding part of the paper is devoted to notices of such authorities as prohibit the slaughter of cattle in the present Kali Yuga.

This paper will be published in Part I. No. 2 of the Journal.

- 2.—*Notes on Arabic and Persian Inscriptions, No. II.*—By H. BLOCHMANN, M. A., Calcutta Madrasah.

(Abstract.)

This paper is a continuation of a similar one published in last year's Journal, and contains the text and translations of inscriptions according to rubbings received by the Society from Messrs. E. Vesey Westmacott, C. S. Dinájpúr; J. Wilson, C. S., Badáon; and Dr. James Wise, Dháká.

The inscriptions are of importance for Bengal History. Mr. Westmacott's rubbings comprise the famous Gangarāmpúr Kai Kāús inscription (A. H. 697); one by Sikandar Sháh (A. H. 765); one by Muzaflar Sháh (A. H. 902), and Husain Sháh (A. H. 918).

Dr. Wise's rubbings from Dháká and Dhámraí, north of Dháká, refer to the reigns of Mahmúd Sháh (A. H. 863), Fatḥ Sháh (A. H. 887), and Husain Sháh (A. H. 922).

Mr. Wilson's rubbings from Badáon belong to the reigns of 'Iltish [Altamsh], (A. H. 628); 'Aláuddin, (A. H. 707); and 'Álam Sháh, (A. H. 883).

The paper will be published in Journal, Part I, No. I, about to be issued.

- 3.—*The Buddhistic remains of Bihár in Patna* by A. M. BROADLEY, Esq., C. S.

The reading of this paper was postponed.

- 4.—*Essays on the nature and origin of the Inflexional post-positions in Hindi declension and their equivalents in other Gaurian languages. Nos. I to III,* by REV. A. F. R. HOERNLE, D. Ph. Tübingen, Professor of Sanscrit, Joy Narain's College, Benares.

The Secretary read the introductory chapter of the Essay. Dr. Hoernle uses the term *Gaurian* as a collective name for the Sanscritic languages of Upper India. The word *Gaur* is used by Sanscrit authors as opposed to *Dravida*; and inasmuch as the latter term has been applied to the languages of Southern India the word *Gaurian* would be an appropriate collective name for the Sanscritic languages of Upper India.

Dr. Hoernle's Essay will appear in the second number of the Philological part of the Journal.

Bábu Rájendralála Mitra took exception to the use of the word *Gaurian* to indicate the Sanscritic vernaculars of India. *Gauḍa* in Sanskrit was a

proper name for a part of Bengal extending from Mithilá to Orissa, and its derivative *Gaudíya* could not comprehend all the Sanskritie vernaculars to which the author of the paper proposed to apply them. In another sense it was a common name for five provinces, *viz.*, Kányakubja, Sáravata, Gauda, Mithilá, and Utkala. The original settlers, particularly Bráhmans, of those places, call themselves *Gauda*, and everything relating to them, including their languages, is named *Gaudíya*. But this classification has not been adopted to mark any linguistic peculiarities, and inasmuch as it excludes from the *Gaudíya* class the Marhattí, which occupies a very prominent place among the Prákrita or Indo-Aryan dialects, it cannot be used without assigning to it a much greater comprehensiveness of meaning than the Hindus, whose term it is, ever attached to it. The Kashmirí, the Nepálí, the Assamese, the Uriyá and other languages will have to be included in it, which it never indicated. To the European it will be literally unmeaning, and to the Hindús misleading, and it could not, therefore, be preferred to the term in common use, the Indo-Aryan or Sanskritie, which was well understood and as precise as a technical term need be. A writer once suggested *Cis-Índhyian* as an appropriate term for the Sanskritie vernaculars, but it was as defective as the *Gaudíyan*, inasmuch as it also excluded the bulk of the Marhatti.

Dr. Collis asked, why, if the term *Dravídian* be accepted, the term *Gaurian* should be objected to; the *Panch Gaur* and *Panch Dravíd* being apparently terms of equal value, why should one be objected to and the other be retained?

Bábu Rájendralála Mitra, in reply, said that he was not prepared to defend the use of the word *Dravídian*, in the sense in which Caldwell and other Tamil scholars had used it, for, like the *Gauda*, its radical *Dravída* had been used by the Hindus to indicate five different provinces south of the Vindhya, the *Pancha Dravída* including *Dravída*, Karpáta, Gujjaráta, Maháráshtra, and Talinga country, the language of two of which (Gujjaráta and Maháráshtra) were Sanskritie, and not Tamilian. But the use of the word in this comprehensive sense was now obsolete, and since it was now restricted to the Coromandel Coast, from Madras to Cape Comorin, its derivation may be used to indicate languages allied to the Tamilian without causing misapprehension. It can plead likewise the sanction of usage, which cannot be predicated of *Gaurian*. When a new term has to be coined, it should be so formed as to connote exactly what is wanted, neither more nor less. The terms Sanskritie and Indo-Aryan had great advantage in this respect over what has been recommended to replace them, and he could not therefore accept it, as superior or more appropriate.



5.—*The Legend of Bághesar, a deified spirit held in great reverence by the Kúsrú, Súrí, Markám, Netia and Sársún clans of the Gond tribe,—by*  
CAPTAIN W. L. SAMUELLS, *Assistant Commissioner, Mámbhúm.*

This paper contains a curious legend current among certain clans of Gonds, descended from a family of five brothers named Kúsrú, Súrí, Markám, Netia and Sársún, that once upon a time a tiger cub was born to Kúsrú. As it grew up, the young tiger made itself very useful in keeping predatory animals from its father's crops, and in consequence the greatest affection existed between them. To Kúsrú's intense grief the cub died, but shortly afterwards his wife gave birth to a daughter who in due time became marriageable. The marriage ceremonies had been completed and the party were about to enjoy themselves with feasting and dancing, when suddenly a frightful sound is heard proceeding from one of the company who had become possessed with a demon. On interrogation by an exorcist the demon is recognised by Kúsrú to be the spirit of his lost tiger-son. The demoniac is appeased with the sacrifice of a live kid which he tears in pieces after the manner of a tiger, and after being presented with three cupfuls of liquor and some mouthfuls of fine ghí, disappears. The appearance is considered a most happy omen, and Kúsrú's tiger-son is thenceforth deified and worshipped under the name of Bághesar by the five clans.

Captain Samuells then gives a graphic description of the custom existing to this day among the descendants of the five brothers, that during their marriage ceremonies it is usual for one or two of those present, generally the officiating priest and a looker on, to feign being possessed with the soul of a tiger, and in that state to kill and tear to pieces a live kid. The demons are afterwards appeased by the bride's father with an offering of three cupfuls of liquor and a mouthful of ghí. No marriage ceremony in these five clans is considered complete without the appearance of Bághesar and the attendant rites.

The paper will be published in Part I, No. 2 of the Journal.

Dr. Dobson, by permission of the President, exhibited some photographs taken in the Andaman Islands.

The receipt of the following communications was announced.

1. On the identity of the Siluroid genera *Erethistes* and *Hara*, by Surgeon Major F. Day.
2. On the Mammals and Birds, inhabiting Kachh, by Dr. F. Stoliczka.

## OBSERVATIONS ON INDIAN BATRACHIA,—by DR. F. STOLICZKA.

[Read, and received 1st May, 1872.]

The following notes\* refer to various imperfectly known Batrachia, of many of which I had opportunity to observe live specimens and to note their coloration. Several species are recorded which had not been previously known from the Indian and Indo-Malayan regions, and of others I have traced the geographical distribution, as known up to the present time. The relations or identity of a few genera and species will also be found discussed in the following pages.

## 1. OXYGLOSSUS LIMA, Tschudi.

This was obtained by Mr. Kurz at Tonghoo, in Pegu, and I also got it in Lower Bengal. Both, it and *O. levis* occur at Moulmein, Tenasserin, (see Proc. A. S. B., 1870, p. 273).

*O. levis*, together with a new species† from Bangkok, is placed by Prof. Peters‡ in a new genus, *Phrynoglossus*, merely differing from *Oxyglossus lima* by having the tongue rounded (not pointed) behind, and nearly entirely grown on, though quite free at the posterior edge. I do not think that many, who have specimens of *O. lima* and *levis* before them, will appreciate this generic difference. The two frogs perfectly agree in general form and character, absence of vomerine teeth, free fingers, entirely webbed toes, two unequal metatarsal tubercles, a short fold on the inner side, and a more or less distinct tubercle at the lower base, of the tarsus, &c.; the habits are also exactly the same, the frogs occurring together in pools of water along streams. The only structural difference of *O. levis* is, that the nostrils are more apart and the fingers shorter and more stumpy. In both species I observe a slight fold from behind the eye to the shoulder passing above the hidden tympanic region, and a second short fold from below the eye to the mouth; but both these folds are very indistinct in fresh specimens, they only become better discernable when the skin is a little dried, or has shrunk in spirits.

## 2. PYXICEPHALUS BREVICERPS, (Schneid.)

A specimen from Jabalpur (Cent. Provinces) is above uniform yellowish, or rather pale pinkish, brown, without a vertebral line; a stripe

\* These notes were written about ten months ago, but I had delayed their submission to the Society, because I expected to add to them the descriptions of several new species discovered by Major Beddome in South India, and also because I contemplated to give illustrations of several imperfectly known species. Both these objects are at present impracticable.

† *Ph. Martensii*.

‡ Monatsb. Akad., 1867, p. 29.

between the snout and eye, three spots on the upper lip, a broadish streak from the eye to the middle of the belly and the cross bars on the limbs blackish brown; tip of snout, extreme edge of upper lip and the whole of the under side yellowish white. Skin above very finely, below on the belly and hinder side of femora rather coarsely granular. Body 1·7", equal to the distance between anus and the shovel, hind-limb 2·25 inches.

The uniform coloration recalls *P. rufescens*, but it has not the rough and granulose body, which that species is said to possess. I think Anderson's *P. khasianus* (Journal A. S. B., xl, p. 23) is the same as the one named *P. Frithii* by Theobald, in Cat. Rept. A. S. B. Museum, 1868, p. 81, while the type of *P. lividus*, Blyth, (ibidem, p. 82) is to all appearance a small *Cacopus globulosus*, Günther, but the specimen is in such a bad condition that no absolute reliance can be placed on it, and the name *lividus* should, therefore, be cancelled.

### 3. RANA CYANOPHLYCTIS, Schneider.

I have often observed that adult males do not reach the same size as females, the former growing up to about 2 inches, while the body of the latter often attains 3 inches, but the males have the green colours brighter, and the tubercles on the back more distinct and pointed. The lower side is in males generally pure white, in females often mottled with dark.

This species is undoubtedly a Western form and must be referred to the Indian fauna with African admixture. It is very common all through Sind, Panjáb, the valleys of the Himalayas, (in Kamaon up to about 6000 feet), all through the Central Provinces, South India and Ceylon, and extending eastward into Bengal, but I have not seen any specimens from Barma and the Malay country to the south.

Young specimens have the groups of vomerine teeth often so indistinct as to become scarcely traceable, and these specimens might from mere description easily be taken for *Dicroglossus Adolphi* of Günther, but unfortunately I never met in Sikkim with the latter species.

### 4. RANA TIGRINA, Daud.

Males have in breeding season the thumb and inner part of palm very much swollen.

I have seen specimens of this frog from all parts of India and Barma, as far west as the Indus and the base of the Himalayas. It belongs to the Indo-Malay fauna, and its geographical distribution is gradually extending to the West, where it is much less common than in Bengal.

### 5. RANA LYMNOCCHARIS, Boie, (= *R. gracilis*, Wiegman.)

This has the same general geographical distribution as *tigrina*. It no doubt occurs plentifully far inland, but along the Arakanese and Barmese

coasts it is the most common frog. In Sikkim I observed it up to 7000 feet, and the specimens obtained at higher elevations are generally young, or perhaps never grow to a large size; their hind limbs are often proportionately much longer than in adults.

Since the notes on *R. lychnocharis*, var. *Nicobarensis*, (J. A. S. B., Vol. xxxix, Part II, 1870, p. 144) were published, I had received a large specimen of this frog from Nancouri, Nicobar islands. The length of body is 2·5"; form and coloration typical; snout obtuse as in the Andaman variety, but the webbing of the toes is very slight, the web reaching on the 4th toe only to the 2nd joint, the three terminal joints being free; on the 5th finger the two terminal joints are free. No distinct cutaneous fringe, either on the inner or on the outer side of tarsus or toe; inner metatarsal tubercle elongated, marginal, outer nearly obsolete.

Dr. Anderson (Proc. Z. Soc., 1871, p. 200) appears to doubt that the Andaman and Nicobar forms really belong to *lychnocharis* (= *gracilis*), but does not support his scepticism with facts. I am confident that none of the forms which I have described from those islands and from Penang, differ essentially from the continental frog, and that they can only be considered as local varieties of it. ♀

Professor Peters recently described (Monatsb. Berl. Akad., 1871, p. 646), an allied species from Pegu as *R. brevipalmata*, in which the hind-limb is very nearly double the length of the body; the hinder side of the femora is light rusty brown with dark marblings. I have not seen this form, but would not be in the least surprised, if it should turn out to be only a local variety of *lychnocharis*.

#### 6. RANA LIEBIGII, Günther.

Comp. Anderson in Proc. Z. S., 1871, p. 198.

This species is found between about 4000 and 10000 feet in Sikkim. The adult males have the sides of breast, the inner arms and the fingers externally studded with small, black, horny tubercles. Mr. Blanford found it abundant in the interior of Sikkim.

#### 7. RANA SIKKIMENSIS, Jerdon.

Proc. A. S. B., 1870, p. 83.

*R. Ganumti*, Anderson, Journ. A. S. B., 1870, p. 21.

Jerdon says that his *Sikkimensis*\* differs from *Liebigii* by its more fully webbed feet; but this statement is to the point, and as Dr. Anderson does not refer to this comparison, I do not think that his lengthy description gives more information than Jerdon's short reference. In *Liebigii* the toes are also fully webbed, particularly in the young, but the web reaches only as a narrow fringe to the tip of the fourth toe, while in *Sikkimensis* it reaches it in a straight line from the adjoining toes. The proportions of the body and color-

\* Of which I saw the specimens.

ation are almost quite identical in equally large specimens of the two species, but the head is a little higher, the groups of vomerine teeth larger, the lips and sides of the body and of the limbs more distinctly spotted or variegated with black in *Sikkimensis*, than in *Liebigii*, and the skin is in the former quite smooth with only a few scattered enlarged tubercles, while in *R. Liebigii* it is rough, and has besides numerous enlarged tubercles. All these characters are, however, not easily observed, and they are less marked in some specimens than in others, while the fuller webbing of the present species, as compared with *R. Liebigii*, is constant.

#### 8. XENOPHYS MONTICOLA, Günther,

Rept. Brit. Ind. p. 414, and Anderson, P. Z. S., 1871, p. 200.

I picked up some not fully developed and very young specimens in September, between grass at the edge of a tank below Darjeeling. All have the tips of fingers and toes markedly enlarged as in ordinary tree-frogs, and the toes also distinctly webbed at the base; none of them shew a trace of vomerine teeth, which become developed in the more adult.

#### 9. HYLARANA MACRODACTYLA, Günther.

This Chinese species\* extends into Barma. I have received numerous specimens through Mr. Kurz from Pegu, but they are all of small size, the body measuring about one inch in length. The total length of the hind limb varies; sometimes it is double that of the body, but generally somewhat less. In several specimens the fourth toe is only half the length of the body, which seems to be a peculiarity of the young frog. All other characters perfectly agree with Günther's description and figure.

#### 10. HYLARANA ERYTHREA, (Schlegel).

This species also extends from the Philippine islands through Siam into Lower Bengal. I lately obtained two specimens near Calcutta (April 1871).

Body above bright olive green, (turning to brownish green in spirit), glandular folds silvery white, the upper one at each side margined with black. The lower fold is indistinct in the young, but in the adult it continues to the hind limb, and the sides of the vent below it are tubercular. Limbs above brownish green, very minutely mottled with dark, and on the outer edges tinged with silvery; the outer sides of the tibiae are besides longitudinally striped. Hinder side of the femora green with black spots, about the middle densely tuberculated, while the rest of the skin above and below is smooth. The larger of two specimens measures: body 1.75 inches, being equal to the distance from the anus to half the tarsus; fourth toe scarcely longer than half the body. Two oblique groups of vomerine teeth. Two metatarsal tubercles, the one at the base of the 1st toe small, compressed, the other at

\* Günther's types were from Hongkong.

the base of the 4th toe rounded, flattened, more distinct in the young than in the adult.

11. *HYLARANA TYTLERI*, Theobald.

Stoliczka, Journ. A. S. B., xxxix, Pt. II, p. 148.

This species is as yet only known from Lower Bengal and Barma. It is perfectly distinct from *B. erythræa*. Since the publication of my notes (loc. cit.) I have received several specimens from Pegu\* through Mr. Kurz.

In most of these the 4th toe slightly exceeds half the length of the body, and the distance from anus to heel is somewhat more than its total length. The coloration perfectly agrees with the specimens formerly described from Moulmein.

22. *HYLARANA MALABARICA*, (D. and Bib.)

The back is during life vinaceous red (not brick red), paler on the snout and passing into vinaceous ashy with a few black dots on the sacral region; limbs above dull black, mottled and spotted with reddish white; upper arm with a longitudinal blackish band on the exterior-inferior side, and another one on the postero-superior; sides of body pure black, with or without a few white spots; glandular folds white, the upper one is not very distinctly defined from the vinaceous red colour of the back; the lower is interrupted on the humeral region, but distinctly continues to the groin; upper lip with a white stripe, its edge being dull vinaceous black, and of the same colour is also the throat and breast, being mottled with paler and passing towards the vent into almost pure white. The swollen tips and joints of the fingers and toes are reddish white, and the two metatarsal tubercles pure white.

I met with several specimens of this frog at Nadauli on the Western Ghâts. The body of the largest is only 1.5 inch, equal to or slightly less, than the distance from the anus to the metatarsal tubercle.

I very much doubt that the Chinese species which Steindachner (Amph. Novara Exp., 1867, p. 48) describes under the name of *malabarica* is really identical with our Indian frog. He says, that the toes are half-webbed and the tips on the fingers indistinctly developed, while in *malabarica* the toes are barely half-webbed, and the tips of the fingers very distinctly swollen (at least in fresh specimens). The general coloration of both is certainly very similar, but in detail Steindachner's description is not easily applicable to true *malabarica*.

13. *HYLARANA MONTICOLA*, Anderson.

Journal A. S. B., 1871, p. 25.

The only type specimen is a female. I obtained a male in the Rungnu valley (Sikkim) at about 4000 feet elevation. The structure and coloration

\* Dr. Günther (Proc. Z. S., 1868, p. 479) quotes the Ceylonese *H. macularia* also from Pegu; might this not be a specimen of *Tytleri* or *nigrovittata*?

perfectly agrees with Anderson's description, but the male has the thumb much swollen at the base and the vocal sacs largely extended; it does not appear to attain the same large size as the female. The length of the adult male is: body 1·75", slightly less than the distance from the anus to the heel, hind limb 3·25 inches, the fourth toe is equal to half the length of the body. This is apparently a very rare species.

#### 14. *HYLARANA PIPIENS*, Jerdon.

Proc. A. S. B., 1870, p. 83.

Body rather slender and depressed as in *H. monticola*, snout obtuse, half as long as the greatest breadth of the head. Nostrils moderate, directed backwards and upwards; half way between the eye and the tip of snout; tympanum not very distinct, equal to about half the longer diameter of the eye, upper glandular fold well developed, lower slightly interrupted on the humeral region and lost on the side of the belly; disks on fingers and toes well developed, the former free, the latter almost fully webbed, the web reaching to the tips of the 3rd and 5th, but only to the penultimate, joint of the 4th toe. Skin smooth. Vomerine teeth very close to each other; tongue ovate, distinctly lobed behind.

Olive brown above, with a few scattered dark spots on the back, limbs above with numerous, dark brown linear cross bands; sides of head and neck black which colour gradually passes into brownish on the side of the belly; upper glandular fold whitish, margined black below, upper lip and lower glandular fold silvery white; edge of upper lip and lower side on chin and throat whitish, tinged and marbled with olive; belly white, sacral region and lower side of limbs tinged yellow, hinder side of femora indistinctly marbled with olive brown.

A specimen was obtained by Mr. W. T. Blanford in the Tista valley (Sikkim) at between 4000 and 5000 feet. Length of body 1·3 inches, being somewhat less than the distance from anus to heel, total of hind limb 2·6", being double the length of the body; 4th toe 0·7", very little more than half the body. Inner metatarsal tubercle small, outer represented by an indistinct smooth swelling only.

This species is close to *monticola*, differing from it by a somewhat less obtuse snout, by the vomerine dental ridges being very close to each other, by its comparatively longer hind limb, and by its brown (instead of grey) coloration, with numerous very narrow dark bands on the limbs. Dr. Jerdon found the species common at Shillong on the Khasi hills, (Comp. l. cit.). I had opportunity about two years ago to examine his specimens.

#### 15. *POLYPEDATES MACULATUS*, (Gray).

Dr. Anderson could not have observed many live specimens of this frog, when he states (Proc. Z. S., 1871, p. 207), that it is found among long

grass and not ..... on trees.' It is a very common species in Bengal, extending through the Central Provinces into the Malabar country and apparently also to Ceylon.\* I have seen specimens from as far west as the Ganges at Hardwar, from Sikkim, Barma and Penang. Around Calcutta it is common among high grass near tanks and rivers, but it is certainly quite as common on the leaves of different palms and of *Musa*, particularly at the roots of the leaves where water accumulates.

Young and half grown specimens are above either uniform pale whitish green, or with numerous darker spots which on the posterior part of the body sometimes become longitudinally confluent; limbs with cross bands.

Adults are during life dull yellowish white with† dull green spots and bands, darkest at the sides of the head. This is the general colour, while the animal is at rest, but the moment it begins to move about, the white of the body changes to more or less dusky brown, the spots become dark green and the sides of the head almost black. Occasionally some of the green spots are tinged with rufous brown, but that is rarer. The pale colours change to pure or dusky white, or brownish, and the green spots to black or dark brown in spirit. The hourglass-shaped mark is rarely distinct in Bengal specimens, and I have not seen a single one in which the skin was grown to the occiput, but adults generally have a slightly interrupted osseous crest indicated. The posterior sides of the belly, and the front and hinder sides of the femora are always marked with roundish yellow spots, intermixed with a dark violet reticulation. Lip white in young, golden iridescent in adults. The outer edge of the tarsus and of the fifth toe has always a very conspicuous light golden band, margined below with blackish green, and both bands are also indicated on the outer edge of the tibia. Lower side of the body uniform white in young; throat in adults tinged with pale golden and mottled with dusky violet, and the lower belly tinged with dusky brown. Pupil black, horizontally elliptical; iris greenish golden.

On the fore limb there is a basal web present between the 1st and 2d and 2d and 3rd fingers, between the 3rd and 4th it is almost obsolete. On the toes the web generally reaches to the tip of the 5th toe, but not usually to that of the 3rd toe (not 'fingers' as noticed by Günther), however in fresh specimens there is a free cutaneous edge noticeable up to the tips of all toes.

Prof. Peters (Monat. Berl. Akad, 1871, p. 649) says that a new species from Ceylon, *P. viscitiger*, differs from *P. maculatus* by the development of certain flattened prominences on the occiput, by a smaller tympanum, it being

\* I have not seen South Indian or Ceylon specimens.

† A Penang variety has no dark spots.



two thirds\* the diameter of the eye, and by yellow spots on black marbled ground on the hinder side of the femora. The two last mentioned characters certainly do not hold good in a comparison with true *maculatus*, and as I have observed in adult males of the last species a tolerably distinct interrupted crest on the occiput, I cannot but doubt that Peters' *Polyp. biscutiger* is really specifically distinct from *P. maculatus*.

#### 16. POLYPEDATES MARMORATUS, Blyth.

(Anderson, Proc. Z. S., 1871, p. 209.)

Full grown males are barely more than half the size of the females, they have a glandular fold indicated at each side of the back, the thumb very much swollen, and the upper pale coloration is much tinged with violet bluish, with numerous, interspersed yellowish white dots and darker, more or less confluent, spots. The general colour in the female is yellowish green with more or less confluent bluish brown spots. Lower side of femora tinged with pale yellowish red.

*P. marmoratus* is common in the Sikkim valleys at elevations between 1000 and 3000 feet; it is equally common in the Khasi hills, but apparently rarer in Pegu. I have seen only young specimens from the latter country. According to Jerdon it is identical with Günther's *P. Afghana*,† which is, however, stated to possess a smooth skin.

#### 17. RHACOPHORUS MAXIMUS, Günther.

Comp. Anderson in Proc. Z. S., 1871, p. 210.

I have repeatedly observed this frog at the base of the Sikkim hills, about Pankabari, between 1000 and 2000 feet, and I do not think that it ranges much higher, except in the damp and warm valleys. It lives near the watercourses of streams in very dense jungle.

Skin smooth above, on the side of the anterior part of the body, about the shoulders and behind the eye, and on the upper side of the femora and tibiae, finely, but almost spinulously, granular, particularly in adult males; belly and lower side of femora densely covered with subequal, more or less flattened coarse warts; a glandular fold runs from behind the eye to above the shoulder and then to the side of the belly behind the shoulder; the tympanum is usually not very distinct, and rarely wider than half of the longer diameter of the eye.

*Colour during life*; body and limbs bright green above, violet below, palest on the lower chest and belly, brightest on the throat and particularly on the side of the belly, where usually some dark more or less confluent spots are traceable; these are also to be noticed on the lower side of the hind limbs.

\* In adult *maculatus* the tympanum is often barely as large.

† For which Cope proposes the generic name *Amphlops*, characterised as having 'no dorsal-lateral glandular dermal folds.' (See Nat. Hist. Review, V, 1865, p. 117.)

The violet colour is separated all round from the green by a yellowish line, most distinct on the front side of the arms and on the posterior side of the hind limbs; the inner side of the fingers, tarsi and meta-tarsi, and the webbing are also tinged with violet. Below the eye and the tympanum, and on the snout, the green is tinged with blue, the upper lip is paler green than the rest of the head, edge of under lip pale golden yellow, margined with a dark violet stripe on the lower side. Both the green and the violet colours, but particularly the former, often quickly change into various shades, according to the rapidity of the movements of the frog.

The largest specimen observed measures: body 4.25 inch., its length being equal to the distance from the anus to half the tarsus; fore limb nearly 3," hind limb 6.75 inch.

#### 18. *IXALUS CINERASCENS*, Stol.

Stoliczka, in Proc. A. S. B., 1870, p. 275.

I found this species, (originally described from two Moulmein specimens) abundant in a deep valley near Pankabari, at between 2000 and 3000 feet elevation, above the Sikkim Terai, and also at Lebong below Darjiling, at about 5000 feet.

The structure and size of these specimens perfectly agrees with the type, but the coloration varies immensely. The general colour changes from pure to yellowish ashy, tinged with more or less bright reddish or violet at the sides. The dorsal space, included by the dark band between the eyes and the lateral ones above the belly, is either vinaceous ashy, or brown, it forms a kind of bottle-shaped mark which becomes obsolete on the sacral region; sometimes the whole of the upper side is dark vinaceous brown, with mere traces of the dorsal mark; a short black band from the eye to the shoulder is always distinct.

#### 19. *DIPLOPELMA BERDMOREI*, (Blyth).

Anderson, in Proc. Z. S., 1871, p. 202.

*Callula natatrix*, Cope, Journ. Acad. N. Sc. Phil., vi, 1867, p. 192.

The length of the body is half of the total length of the hind limb. In several fresh specimens from Pegu I observe the following coloration: above, yellowish or dusky vinaceous, with a dark bottle-shaped mark, originating between the eyes, being above the shoulders very distinctly margined with white, and becoming indistinct on the posterior part of the back; hind limbs with two or three short dark cross bands; chin and breast blackish, speckled with white, sides of the belly and front side of femora partially, and their hinder side mostly, tinged or marbled with dusky black; a few small pure black, white edged, spots on the fore limb, on the anterior and posterior sides of the femora and tibiae, and about the anus; the foot including the

toes posteriorly entirely black, with a yellowish white edge; belly whitish, sacral region and lower side of hind limbs more or less strongly tinged with red, or reddish yellow.

The coloration as well as the structure of this frog entirely agree with *Diplopelma*, the mere greater length of the hind-limbs can scarcely be considered as a generic difference. Cope refers the species to *Callula*, uniting *Diplopelma* with *Engystoma*. The habits of the Indian species of *Diplopelma* and *Callula* somewhat differ, the former is generally as active as a tree-frog, the latter as sluggish as a toad; in the first there are no osseous vomerine ridges and the head is particularly small, in the latter the osseous ridges appear to be always developed in the adult. Considering these general characters the two forms are, I think, fairly separable, although their close structural affinities cannot be questioned, as I had already pointed out in Journal A. S. B., xxxix, Part II, 1870, p. 155. The greater or lesser swelling of the tips of the toes is a character of no great importance. All the Indian species of *Diplopelma* and *Callula* have the tips of the toes more or less swollen and more or less webbed, but in the American *Engystoma* the toes are free, and the species of the latter genus also are of a somewhat different appearance and colour.

## 20. DIPLOPELMA CARNATICUM, (Jerdon).

Comp. Journ. A. S. B., xxxix, Pt. II, p. 154.

This species occurs all through Barma and Bengal, probably extending into the eastern Panjáb, and southward through the Central Provinces and Orissa into the Carnatic. The largest specimens (somewhat exceeding one inch in length of body) are from Barma, but in Bengal the usual size attained is only three quarters of an inch. Many specimens are met with which have throughout a strong vinaceous tinge, particularly at the sides of the back, while in others the bottle-shaped mark is somewhat indistinct. They live during the day under stones or old wood, along streams and between low vegetation, and often leap about as perfectly as a tree-frog. Old specimens are, however, less active.

## 21. CALLULA GUTTULATA, (Blyth).

See Günther, Proc. Z. S., 1868, p. 490, pl. 40, fig. 1.

In a young specimen from Pegu, the brown markings are united to a large irregular patch, extending from between the eyes to the middle of the back, and thus to a certain extent recalling the coloration of *C. pulchra*. The under side is yellowish white, finely mottled with dusky, particularly on the throat, the sides of which are tinged with pink.

*C. guttulata* has as yet only been obtained in Pegu, but *C. pulchra* occurs both in Barma and in Bengal, extending westward to about a line drawn from the Ganges at Hardwar to Midnapúr. I have seen specimens

from both the localities, and also from Allahabad. Even the youngest I examined had the toes slightly webbed at the base, consequently the young referred by Blanford to this species, (Journ. A. S. B., xxxix, p. 375), could not have been *C. pulchra*.

22. *CALLULA VARIEGATA*, n. sp.

Form typical, with a short blunt moderately depressed head, its width between the eyes being a little more than the longer diameter of an eye; nostrils near the tip of the nose, moderately large, directed upwards and forwards; canthus rostralis rounded, loreal region above slightly concave and sloping; tympanum hidden; skin smooth above, with a few scattered obtuse tubercles at the sides, and below extending towards the vent; skin between the hind limbs moderately extended and loose; an indistinct fold from behind the eye to above the shoulder; no teeth on jaw or palate; choanæ large, ovate, an interrupted soft, not osseous ridge behind them; a second much more distinct transverse fold before the oesophagus, its edge is slightly papillose; tongue very elongately ovate, entire behind, and with fully two-thirds its length free; lower jaw with two slight apophyses. Fingers free, toes webbed at the base only, both rather elongate, slender, with enlarged, truncate tips, the enlarged tips being much more distinct on the fingers than on the toes. Palm at the base with two ovate tubercles, the outer being double the size of the inner; sole also with two unequal tubercles, the inner compressed and only slightly larger than the outer; tarsus without a fold.

Entire upper surface on body and limbs more or less deep brown, variegated with pinkish white, the markings towards the sides and hind-limbs mostly dissolved into smaller or larger spots of purer white; below, uniform yellowish white, slightly dusky at the sides of the throat.

I have examined two specimens\* of this species, both collected by Mr. W. T. Blanford at Ellore. They are very nearly equal in size, and have not the appearance of very young individuals. One measures: body 1.25 inch., hind-limb from anus to tip of fourth toe 1.4 inch., the free portion of the third finger is fully 0.2, and that of the fourth toe fully 0.3 inches long. The fore-limb when laid back just reaches with the tip of the inner finger the groin, and the hind-limb when laid forward touches the snout with the tip of the fifth toe.

The species resembles in general character *C. pulchra*, but has considerably larger toes and fingers, a more elongate tongue and a different coloration. It can hardly be referred to either of Jerdon's species, *C. montana* (? = *obscura*) or *C. carnatica*,† the limb being considerably longer in the former, and shorter in the latter, but it is possibly the species to which Jerdon refers

\* One, lent to me by Dr. Anderson, in the Indian Museum and the other in my collection.

† Journ. A. S. B. xxiii, p. 533.

(Proc. A. S. B., 1870, p. 83) as having been obtained by Major Beddome in South India, and closely resembling *C. guttulata*, from which, however, the present form differs, both in structure and in colour.

### 23. BUFO SIKKIMENSIS, (Blyth).

*Bombinator Sikkimensis*, Blyth.—*Scutigera* id. Theob.—*Bufo* id., apud Anderson, Proc. Z. S., 1871, p. 204.

Dr. Anderson is right in referring this species to *Bufo*, but he is entirely mistaken in his statement, that the species only differs in its free toes and in its slightly notched tongue from *Bufo*. If this were the case, there would be rather good ground for a generic separation; but none of these characters exist. The toes, though very much shrunk, are nearly half webbed and the tongue is entire, but its tip had been in Blyth's types so much pressed against the palate that it formed a groove on it, and this was taken by Theobald and Anderson for a slight notch. The tympanum is hidden, the paratoids sometimes small, sometimes as well developed as in *melanostictus*, and equal in length to the distance from the snout to the posterior edge of the eye. The canthus rostralis is not 'round,' but rather sharp in fresh specimens, and there is a short interrupted ridge in front of the eye and another on the anterior edge of the eyelid. The nostrils are slightly swollen, and nearer to the tip of the snout than to the eye (not 'half way' between the two). The whole upper surface of the body is covered with small pointed tubercles, between which on the back larger, spinous ones, are interspersed; the tubercles on the upper side of the tibiae are of considerable size and larger than those on the femora; a few enlarged spines below the hidden tympanum; sides of the body finely spinulose tuberculated, and lower side rather flatly granular.

Upper side of back and limbs ashy or olive, with numerous more or less confluent vinaceous brown spots, paratoids and the large tubercles distinctly reddish; snout olive, upper lip near the snout and loreal region, below the eye and at the angle of the mouth each with a brown spot; below, pale yellowish throughout, usually densely marbled with olive brown.

The species does not appear to be common in Sikkim; I found a few specimens around Darjiling at an elevation of about 7000 feet, in October. One, though a male, has not the callosities on the breast, as described in the type specimen; it is probable that they are only developed during the breeding season, or after a certain age.

### 24. BUFO MELANOSTICTUS, Schneid.

This is an Indo-Malayan form; it is found throughout India as far west as the Indus,\* but it is decidedly scarcer in the western, than it is in the

\* I have not seen specimens from Sind.

eastern and south-eastern parts of the Indian possessions. In the Himalayas it ascends to nearly 10,000 feet,\* but it is only found on the outer ranges, or as far into the interior as the effects of the rainy season are felt.

## 25. BUFO VIRIDIS.

Himalayan specimens† are very often, above, uniform dull green, but generally with greenish marblings on the breast &c. None that I saw have a distinct cutaneous fringe on the inner side of the tarsus.

A gigantic specimen, caught near Darjiling, measures: total length of head and body 5, total of hind limb 5·8, 4th toe 1·8 inches.

## LIBRARY.

The following additions have been made to the Library since the last meeting.

### *Presentations.*

\*.\* Names of Donors in Capitals.

Proceedings of the Royal Society, Vol. XX, No. 132.—THE ROYAL SOCIETY OF LONDON.

Journal of the Statistical Society of London, Vol. XXXV, part I.—THE STATISTICAL SOCIETY OF LONDON.

Proceedings of the Royal Geographical Society, Vol. XV, No. 5, Vol XVI, No. 1.—THE ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

Catalogue of Fishes in the Collection of the British Museum, by Dr. A. Günther, Vols. 1-8; Hand-List of Genera and Species of Birds distinguishing those contained in the B. M., parts 1-3; Catalogue of the specimens of Heteropterous-Hemiptera in the Collection of the B. M., parts 1-4; Catalogue of the Specimens of Dermaptera Saltatoria in the B. M. parts 2-5 by F. Walker; Catalogue of Hispidæ in the B. M., by J. Baly, part 1; Catalogue of Halticidæ in the B. M., by the Rev. H. Clark; part 1; Guide to the Systematic Distribution of Mollusca in the B. M., part 1 by J. E. Gray; List of the specimens of Lepidopterous Insects in the B. M., by F. Walker, parts XXVII. to XXXV; Catalogue of the Conchifera or Bivalve shells in the B. M., part 1-2; List of the specimens of birds in the B. M., by G. R. Gray, part III, sec. 3-4, part V; List of the Mollusca in the B. M., part II; Catalogue of British Fæssorial Hymenoptera and Formicidæ and Vespidæ in the B. M., by F. Smith; Catalogue of Orthopterous Insects in the B. M., part I, by J. O. Westwood; Specimen of a Catalogue of Lycænidæ in the B. M., by W. C. Hewitson; Catalogue and supplement to the Catalogue of Shield Reptiles, part I, by J. E. Gray; Catalogue of Diurnal

\* In the western part of Sikkim; up to about 8000 in the N. W. Himalayas.

† From the Kulu valley, 5000 feet; Hardwar (about 1000 feet), Sikkim (between 6 and 10,000 feet.)

Lepidoptera described by Fabricius in the B. M., by A. G. Butler; Catalogue of the Bones of Mammalia in the B. M.; Catalogue of Apodal Fish in the B. M., by Dr. Kaup; Catalogue of the specimens of Dermaptera, Saltatoria and supplement to the Blattariæ in the B. M., by F. Waker; Catalogue of the specimens of Blattariæ in the B. M., by F. Walker; Catalogue of the Coleopterous Insects of the Canaries in the B. M., by T. V. Wollaston; Catalogue of the British Non-Parasitical Worms in the B. M., by G. Johnston; Catalogue of the Coleopterous Insects of Madeira, in the B. M., by T. V. Wollaston; Catalogue of Monkeys, Lemurs, and Fruiteating Bats in the B. M., by Dr. J. E. Gray; Catalogue of the Specimens of Amphipodous Crustacea in the B. M., by C. S. Bate; Catalogue of Diurnal Lepidoptera of the Family of Satyridæ in the B. M., by A. G. Butler; Catalogue and supplement to the Catalogue of Seals and Whales in the B. M., J. E. Gray; Catalogue of Carnivorous, Pachydermatous and Edentate Mammalia in the B. M., by J. E. Gray; Catalogue of British Birds in the B. M., by G. R. Gray; Catalogue of Sea-Pens or Pennatulidæ in the B. M., by J. E. Gray; Catalogue of the Birds of the Tropical Islands of the Pacific Ocean in the B. M., by G. R. Gray; Catalogue of the Mammalia and Birds of New Guinea in the B. M., by J. E. and G. R. Gray; Catalogue of Lithophytes or Stony Corals in the B. M., by J. E. Gray; Catalogue of the Collection of Meteorites exhibited in the Mineral Department of the B. M.; Index to the Collection of Minerals in the B. M.; A Guide to the Collection of Minerals; A guide to the Exhibition Rooms of the Departments of Natural History and Antiquities.—THE TRUSTEES OF THE BRITISH MUSEUM, LONDON.

Journal Asiatique, No. 67.—THE ASIATIC SOCIETY OF PARIS.

Bulletin de la Société de Géographie, Févr. 1872.—THE GEOGRAPHICAL SOCIETY OF PARIS.

Monatsbericht, Januar, 1872.—THE ROYAL PRUSSIAN ACADEMY OF SCIENCES OF BERLIN.

Zeitschrift, Band XXV, Heft 4.—THE GERMAN ORIENTAL SOCIETY OF LEIPZIG.

Jahrbuch, Band XXI, Nro. 3.—THE IMPERIAL GEOLOGICAL INSTITUTE OF VIENNA.

Catalogus codicum Latinorum Bibliothecae Regiae Monacensis, Tom. I, pars 2.—THE ROYAL ACADEMY OF SCIENCES, MUNICH.

Memorie, Vols. XXV, XXVI; Atti Vol. VI, Disp. 1-6.—THE ROYAL ACADEMY OF SCIENCES OF TURIN.

Archivis per L'Antropologia et la Etnologia, Vol. I, fasci 1-2 publicato Dr. P. Mantegazza, Dr. F. Finzi.—THE EDITORS.

The Journal of the Bombay Branch of the Royal Asiatic Society, Vol. IX, No. XXVII.—THE BOMBAY ASIATIC SOCIETY.

Násitka Pravodba, by Harachandra Vasu.—THE AUTHOR.

Die Ahuna-varija-Firmal, von Dr. M. Haug.—THE AUTHOR.

Topography of the Punjab Oil Region, by B. Smith Lyman.—THE AUTHOR.

Professional Papers on Indian Engineering, Vol. I, No. 4, by Captain A. M. Lang.—THE EDITOR.

General Report on Public Instruction in the Lower Provinces of Bengal for 1870-71; Selections from the Records of the Government of India, Home Department No. LXXXIX; Report on Cooch Behar, No. 2.—THE GOVERNMENT OF BENGAL.

Col. Tennant's Report on the Total Eclipse of the Sun, on December, 11-12, 1871; The Flora Sylvatica, part XVIII.—THE GOVERNMENT OF INDIA.

Magnetical and Meteorological Observations made at the Government Observatory 1865-1870.—THE GOVERNMENT OF BOMBAY.

Report of the Meteorological Reporter to the Government of Bengal for 1871.—THE METEOROLOGICAL REPORTER.

Records of the Geological Survey of India, Vol. V, part II.—THE SUPERINTENDENT OF THE GEOLOGICAL SURVEY OF INDIA.

General Report on the Revenue Survey operations of the Upper and Lower Provinces in Bengal for 1870-71.—THE SURVEYOR GENERAL OF INDIA.

#### *Exchange.*

The Athenæum, for March, 1872.

Nature, Nos. 127-130.

#### *Purchase.*

The Annals and Magazine of Natural History, April, 1872.—The Quarterly Journal of Science, April, 1872.—The London, E. and D. Philosophical Magazine, April, 1872.—The Numismatic Chronicle, 1871, part IV.—Revue de Zoologie, No. 2, 1872.—The Indian Antiquary, May, 1872.—The Calcutta Review, April, 1872.—Journal des Savants, Févr, 1872.—Comptes Rendus, Nos. 9-13, 1872.—Harold's Coleopterologische Hefte, VII.—Nouvelles Suites à Buffon, Coléoptères, Tome IX.—Bleeker's Atlas Ichthyologique, Liv. 25.—Gould's Birds of Asia, Part XXIV.—Liddell and Scott's Greek-English Lexicon.—Legge's Chinese Classics, Vol. IV.—Schellen's Spectrum Analysis.—Pratna-Kamra-Nandini, Vol. V. No. 1.





*Notice to Members and Correspondents of the  
ASIATIC SOCIETY of BENGAL.*

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The duties of the London Agency of the Society will hereafter be carried out by Messrs. Trübner and Co. of 60, Paternoster Row, London, and it is requested that all applications in Europe for the publications of the Society, hitherto made to Messrs. Williams and Norgate, may be addressed to Messrs. Trübner and Co., and that all communications for the Society's Journal and Proceedings and all books &c., for the Society's Library may be sent to the same firm.

*Calcutta,*

*July, 1872.*



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR JULY, 1872.

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The monthly general meeting of the Society was held on Wednesday, the 3rd instant, at 9 P. M.

T. Oldham, Esq. LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table:—

1. From Revd. M. M. Carleton, a box of copper coins.

2. From Revd. M. A. Sherring, M. A., a copy of "Hindu Tribes and Castes, as represented in Benares."

The following gentlemen duly proposed and seconded at the last meeting were balloted for and elected Ordinary Members—

Carr Stephen, Esq.

Major W. S. Trevor, R. E.

The following are candidates for ballot at the next meeting—

Bābū Vipinavehāri Mukherji, Baraset, proposed by H. Blochmann, Esq., seconded by Captain J. Waterhouse.

Captain T. St. Quintin Clutterbuck, Attock, proposed by Major F. W. Stubbs, seconded by H. Blochmann, Esq.

P. Dejoux, Esq., Ex. Engr., D. P. W., Calcutta, proposed by G. Nevill, Esq., seconded by V. Ball, Esq.

Rev. Laurentius O. Skrefsrud, Benagaria Mission Station, proposed by H. Blochmann, Esq., seconded by Dr. Anderson.

H. Beverley, Esq., C. S. (for re-election), proposed by H. Blochmann, Esq., seconded by Dr. Anderson.

The following gentlemen have intimated their desire to withdraw from the Society—

J. A. Briggs, Esq., (*on leaving India*).

J. Smith, Esq., C. S.

F. N. Macnamara, Esq., M. D.

The President reported that the Council recommend that His Excellency the Viceroy be solicited to accept the office of Patron of the Society, now vacant by the lamented assassination of the late Lord Mayo.

He remarked that the office had been held by previous Governors General almost uninterruptedly from the time of Warren Hastings, and there was no reason why the precedent should be departed from on this occasion, but every reason why the Society should pay Lord Northbrook the compliment of asking him to become their Patron.

The proposal was carried unanimously.

The President announced that the Council had resolved on changing the London agency of the Society, and that they had appointed Messrs. Trübner and Co. of Paternoster Row, sole agents, from the 1st January, 1873, for the sale of the Society's publications, and for conducting the general agency of the Society, instead of Messrs. Williams and Norgate. The Council for sometime past have had reason to be dissatisfied with the manner in which the duties of the agency had been carried out. Messrs. Trübner and Co. are a well known firm of large experience in duties of the kind, and the Council trust that by the change the publications of the Society may become more extensively known and circulated.

Mr. Wood-Mason exhibited several Andamanese weapons and utensils and made some remarks on the relations of the tribes inhabiting these islands.

Colonel H. Hyde exhibited two Dak'hin and one Bengal silver coins.

Mr. Blochmann said—

The coins are rare. The Bengal silver rupee belongs to the reign of Bahádur Sháh Súr, and bears the year 967, A. H. Marsden gives a figure of it.

The two Dak'hin coins refer to the reign of 'Aláuddín Ahmad Sháh (II.), a Bahmaní King, and appear to bear the year 860, A. H. The first two numerals are clear. Mr. Thomas in his 'Chronicles of the Pathan Kings' (p. 343), describes a specimen belonging to General Cunningham as 'very rare'; but his reading of the obverse, to judge from his wood-cut and Colonel Hyde's specimens, is wrong. The legend is—

## Reverse.

ابوالمظفر علا  
الدنيا و الدين احمد  
شاه بن احمد شاه  
الولي البهمنى

## Obverse.

السلطان  
الحليم الكريم  
الرؤوف علي عباد الله  
الغنى المهيمنى

*The Sultán, the mild, (the just, who is kind towards the servants of the bountiful God), the Muhaimaní\**

*Abul Muzaffar 'Alauddunyá waddín Akmad Sháh, son of Akmad Sháh, the ruler, the Bahmaní.*

'Muhaimaní means 'belonging to Muhaiman,' which is one of the ninety-nine beautiful names of God, who is called so, because he gives protection. The adjective 'Muhaimaní' would, therefore, mean 'protected by God;' and has been formed like ريانى, ممدانى, and other adjectives derived from the ninety-nine beautiful names. The form is rare and does not, perhaps, occur elsewhere; but it was chosen for the legend of the coin, as 'muhaimaní' on the obverse rhymes with 'bahmaní' on the reverse. The coins of the 15th century have almost invariably the *saja*, or rhymed prose, which in the 16th century gives way to metrical inscriptions.

The following papers were read,—

I.—*The Buddhistic Remains of Bihár in Patná.*—By A. M. BROADLEY, Esq., C. S., Dacca.

(Abstract.)

The Bihár Sub-division presents perhaps the richest field for archaeological research in Eastern India. Within its comparatively small limits are situated Rájgir, Nálanda, Bihár, and the Indra-Saila peak, besides a hundred places of less importance, but abounding in the relics of the past. Over the whole surface of the country, neglected, and in many cases mutilated, lie the remains of the sculptures, which once adorned the temples of Buddhism, still often bearing the inscriptions, which record the names of their donors and the date of their dedication. Mr. Broadley has succeeded in making a complete survey of the ruins of Rájgir, and in recovering from the dense jungle, which now covers the ruins of the capital of Bimlisára, a large number of figures and carvings connected with the faith received from the lips of Sakhya Muni himself. The author made extensive excavations at this place, and had almost reached the centre of a tope undoubtedly erected by Açoká, when he left the Sub-division.

\* *Almuhaimaniyu* is nominative, in apposition to *al-sultán*; *alghaniyi* is genitive, in apposition to *alláhi*. Mr. Thomas's رقى gives no sense, and in the wood cut the *re* should have a stroke to join it to preceding *al*. I find that the word 'Muhaimaní' occurs in Mr. Thomas's transcripts of other Bahmaní coins (*loc. cit.* p. 345).

As regards Nálanda, the "gorgeous queen of monasteries," he laboured there for nearly a month, and uncovered three sides of the great temple of Mahipála, which had remained concealed for centuries, under the mound formed by the débris of its lofty cupola. From Nálanda, he recovered an enormous number of carvings and some inscriptions of value. The general result of his work there has been embodied in a small pamphlet, which has been published by the Bengal Secretariat.

Mr. Broadley also made excavations at the following places, sites of monasteries and temples of less importance—Ghosráwan, Titráwan, Tillárah, Rohon, and Bihár. The sculptures recovered from these ruins are also of great beauty.

Mr. Broadley has embodied the result of the whole of his labours connected with the Buddhistic remains in Bihár, in this paper.

The photographs were executed by Dr. Simpson, Civil Surgeon of Patna, whose well-known reputation as a photographer, will be a sufficient guarantee of their value.

The whole of the sculptures collected have been removed to Bihár, and arranged in an appropriate building, which Mr. Broadley designates the 'Bihár Museum'. They number upwards of a thousand, and comprise every variety of object.

As regards the Muhammadan antiquities of Bihár, Mr. Broadley has succeeded in collecting nearly thirty Persian and Arabic Inscriptions of great, historical value, varying in date from the time of 'Izz-uddín Tughril [A. H. 640] up to the year A. H., 1100. Several of these are in the Museum at Bihár, and five of them are grouped in one of the photographs. They throw great light on the history of Bengal, and are of some importance. He has also collected the legends, &c., connected with the celebrated shrines of the Bihár city and the early history of the town, and the country which surrounded it. Besides this, Mr. Broadley had the good fortune to light on a considerable number of coins, the greater part of them being unique. They belong to the time of Ghiás-uddín of Bengal [608-624], Shams-uddín Iltímish [607-633], &c.

The author has embodied all the information on the Muhammadan Antiquities in a paper forwarded to Mr. Bloelmann. The paper will be their joint production.

## II.—NOTICE OF THE MAMMALS AND BIRDS INHABITING KACHH, by DR. F. STOLICZKA. (Abstract).

After a few general remarks respecting the physical geography of the province of Kachh, and which were read by the author, notes on twenty-eight mammalia and one hundred and sixty birds are given.

Among the former two new species of bats are described by Dr. Dobson under the following names :

*Taphozous Kachhensis*, resembling *T. saccolaimus* in form and size, but differing from it in the absence of the gular pouch in both sexes.

*Pipistrellus leucotis*, distinguished by the white colour of the ears and wing membranes, and by the form and unequal size of the upper incisors.

A new species of hedgehog is noted under the name *Erinaceus pictus*. General colour brownish albescent, snout brown, with a brown band through the eye to the angle of the mouth, hind head and neck white; below thinly hairy, white; feet and near abdomen, including the very short tail, brown; a broad nude space between the ears above; five toes on all feet; ridges on spines tuberculated. This species also occurs in the North-West Provinces.

The author adds a general review of the Indian *Erinacei*, noticing some of the more important distinctive characters of the species which he examined, and he gives the description of a new species, *E. albulus*, lately received by the Indian Museum through the Yarkand expedition. It resembles *E. pictus*, but is larger and with a more pointed snout, no perceptible nude space between the ears; head rufescent, except at the posterior edge of the upper jaw, which is white; entire underside thickly hairy, white, passing into rufescent at the sides; ears, feet partially, and tail, brownish.

A full description of *Herpestes griseus* is given. It is also stated that the only Gazelle occurring in Kachh is *G. Bennetti*, and not *G. Christii*.

Of birds 160 species had been collected by the author, and of many of these notes are given. The more interesting species under notice are: *Falco Babylonicus*; *Ptionoprogne rupestris*; *Caprimulgus Maharattensis*; *Picus Maharattensis*, a small variety, with the white spots larger and more numerous, closely approaching the Barmese *P. Blanfordi* of Blyth, which is also considered as a mere variety of *Maharattensis*; *Saxicola Kingi*, Hume (Ibis, 1871, p. 29); *Sax. atrogularis* = *montana* of Gould is stated to be merely a larger race of *S. deserti*, as originally recorded by Jerdon; *Drymoipus Jerdoni*, Blyth, (= *Prinia rufescens*, Hume, Ibis, for 1872,) *Phylloscopus tristis*, *Parus nuchalis*, Jerdon; *Fringillaria striolata* (Comp. Hume, Ibis, 1870, p. 399). A comparatively large number of GRALLÆ and NATATORES occurs, the majority of which inhabit Europe and Northern Asia during the summer.

Only a single new species is described as *Pratincola macrorhyncha*. General plumage dull brown, all feathers rather broadly margined with fulvescent whitish; below fulvescent white; wing 2·9, tail 2·1 to 2·2, tarsus 0·95, bill at front 0·5, from gape 0·72, hind toe with claw 0·57, claw alone 0·3 inch. The bill is as slender at the base as in *Pratincola*, but nearly quite as long as in *Saxicola*, while the slenderness of the hind claw does not



agree with either genus, but rather with *Oreicola* (= *Rhodophila*). Two specimens were obtained, both probably females; for they very much resemble in plumage female birds of *Pratincola*.

The President remarked that although Dr. Stoliczka had only read the opening pages of his paper, he had seldom listened to a clearer or more complete sketch of the physical geography of a small district.

The aspect of Kachh was very peculiar, and the character of the country very marked, but it was not by any means an easy task to bring such peculiarities so clearly forward, as to enable a reader of the description to realize them. There was one point on which very possibly Dr. Stoliczka had enlarged, though in the abstract he had given he had not noticed it, and that was of some interest as bearing on the geographical distribution of animals and plants. This distribution was often spoken of as if people really supposed that there was something in the animal itself, some law of existence born with it, which prevented the possibility of such organised beings overstepping fixed boundaries or limits of area. Now Kachh was a peculiarly good instance in point. Dr. Stoliczka had shown very briefly the extremely limited number of its fauna and even of its flora; and it became quite clear that numerous animals which were to be found in adjoining districts and not in Kachh were absent from this Province, solely because the physical conditions favourable to their existence did not exist. The moment these conditions came into being again, even within the same geographical area, the animals and plants were found to accompany them; and the peculiar physical conditions of the province of Kachh rendered it an admirably compact and useful illustration of this fact.

### III.—ON THE IDENTITY OF THE SILUROID GENERA *ERETHISTES* AND *HARA*,— by Surgeon Major FRANCIS DAY.

[Received 28th May, 1872.]

In my resumé of the fishes included in Genus *Hara*, Blyth, and published in the "Journal of the Asiatic Society of Bengal," 1870, p. 40, I did not include *Erethistes pusillus*,\* Müller and Troschel (*Horæ ichthiologicæ*, 1845), as that fish, the type of the Genus, was stated to be destitute of barbels (except perhaps maxillary), whereas there are eight barbels in *Hara*.

Blyth in 1860 when describing the species, constituting his new genus *Hara*, made no allusion to *E. pusillus*, and Dr. Günther in his fifth volume of the Catalogue of fish placed *Hara* as a doubtful constituent of his sub-family *Siluridæ proteroptera*, and *Erethistes* as probably one of the *Siluridæ proteropodes*.

I now propose advancing the opinion that not only are the genera

\* This fish came from Asam where *Pimelodus Hara*, H. B., is found.

*Erethistes* and *Hara* the same, but that the typical species of both is identical. In other words that *Erethistes pusillus*, Müll. and Trosch., the type of genus *Erethistes*, is the same as *Pimelodus hara*, Ham. Buch., the type of the genus *Hara*, Blyth.

Having a few months since obtained a copy of "*Horæ ichthiologicæ*" from Berlin, I found that the figure of *Erethistes* (excepting in the absence of barbels) corresponded with specimens of *Pimelodus hara*, H. B., not only in the long processes about the nape and in the humeral region, but also in the pectoral spine and the number of fin rays. As, however, some of the apparent differences might be owing to the bad state of preservation in which the individual specimen was, or due to the abnormal absence of barbels, &c., I sent through Dr. Stoliczka a copy of my figure of *Hara Buchananii*, Blyth, to Dr. E. von Martens at Berlin, and he and Professor Peters having both kindly re-examined the type, came to the following conclusions.

Dr. E von Martens says that the original specimen described by Müller and Troschel in 1845 is still in the Berlin Museum, and that it agrees in general aspect, from above, below, and laterally, with the figure of *Hara Buchananii*, also that the distribution of the denticles on the strong ray of the pectoral fin is the same, namely pairs of divergent denticles along its convex edge, and stronger ones on its concave. The mouth is injured in the specimen, and the barbels not visible.

Professor Peters also remarks that the original specimen is not in a good state, but that it agrees in every respect with *Hara Buchananii*, except that it has no barbels; he suspects, however, that they may have been lost; for, he says, 'instead of the lower barbels there are on each side two small papillæ to be seen, placed exactly in the same way as the barbels in Mr. Day's drawing.'

The name of the genus, therefore, must be *Erethistes*, not *Hara*, the former having the priority, whilst *E. pusillus* will be a synonym of *Erethistes hara*, Ham. Buch., the name under which the Asamese species must stand.

#### IV.—MONOGRAPH OF INDIAN CYPRINIDÆ, (Part, VI),— by Surgeon Major F. DAY.

This paper contains additions to the previous five parts on the same subject; it will appear in the Journal.

#### V.—NOTES ON FISH, COLLECTED BY DR. STOLICZKA IN KACHH,— by Surgeon Major F. DAY.

The author enumerates eighteen species of fresh water fish from Kachh. A new *Cyprinodon* is described as an addition to the Indian fauna, the occurrence of the genus in Indian fresh waters not having been previously known.

VI.—NOTES ON SOME NEW SPECIES OF REPTILIA AND AMPHIBIA, COLLECTED  
BY DR. W. WAAGEN IN NORTH-WESTERN PANJAB,—

by DR. F. STOLICZKA.

Dr. Waagen has handed over to me a most interesting set of Reptilia and Amphibia, which he collected on his recent geological tour in the Saltrange of the Panjab, on the Indus about Kalabagh, in the Agror valley, and at Marri. Out of twenty species, I find four undescribed, three lizards and one frog. The former are all of extreme interest; two are second known species of each of the genera *Gymnops* and *Blepharosteres*, both peculiar to Western and Central India, and the third is a *Stellio* of which I gave a review in the first number of the Journal for the current year.

The collections of Reptiles recently made in North-Western India appear to reveal a much greater richness of forms, than might have been expected from the aridity of the climate of these regions.

LACERTILIA.

1. *ACANTHODACTYLUS CANTORIS*. (*Vide* ante p. 85, and J. A. S. B., XLI, Pt. ii, p. 91). Saltrange, and along the Indus about Kalabagh.

2. *OPHIOPS JERDONI*. (*Vide* ante p. 74 and J. A. S. B., XLI, Pt. ii, p. 89). Saltrange, apparently common; also near Attock.

3. *GYMNOPS MEIZOLEPIS*, n. sp.

Form and proportion of the body quite similar to those of *G. microlepis*,\* but the scales are larger and fewer in number.

One anterior and two posterior frontals, both depressed along the middle of the snout; vertical broad in front and obtuse, gradually narrowing posteriorly; two large supra-orbitals, separated by a sub-triangular small shield from the post-frontals, and by a narrow shield from the outer hinder occipitals, these latter are separated from each other by a narrow median occipital, followed by a small shield, and are much larger than the anterior occipitals, each of which is triangular. Nostrils moderately swollen, between an upper and lower shield, the former in contact behind the rostral, and a third smaller post-nasal, which is again followed on the canthus rostralis by a small shield, appearing to be a detached portion of either the anterior loreal or the anterior frontal. A ring of small shields round the eye, as if there were a rudiment of an eyelid on the front and hind angle, exactly as in *G. microlepis*.

\* When speaking of the scales of this species at p. 91 of J. A. S. B., XLI, pt. II, the sentence was unfortunately made to read, as if all the scales of the body were smooth; this is a mistake. Only the scales on the foreneck are sometimes almost granular and smooth, but all others are always distinctly keeled, though of very small size.

Eight upper labials, the fifth under the orbit and much narrowed at the lower edge, the eighth is in immediate contact with the upper large and a lower small shield on the front edge of the spacious ear. Seven or eight narrow lower labials, also extending to the ear. Six pairs of enlarged chin-shields, the three first in contact. All scales above and at the sides keeled; those on the foreneck almost granular, and merely obtusely pointed; on the body of moderate size, arranged in tolerably distinct transverse rows; those on the tail become still larger, sharper keeled, and are verticillate. There are twenty-eight longitudinal rows of scales across the back between the six rows of enlarged smooth ventral scales, and forty-five lateral transverse rows between the fore and hind limb. The shoulder-fold is continued on the breast, indicated by a row of three much enlarged shields. Twelve femoral pores on either side, separated in the middle by one shield. Preanal shield moderately enlarged, with a slightly smaller one above it. Sub-caudals not enlarged. All the scales on the upper side of the fore limb are enlarged, on the hind limb only those in front are large, the remainder being very much smaller than those on the upper side of the body; the same difference in the size of the scales also exist in *G. microlepis*, but it is less prominent.

Fingers and toes very slender and sharply keeled below. The fore-limb when laid forward extends a little beyond the snout, and the hind limb nearly to the hinder angle of the eye.

*Colour* olive green, above, with whitish dorsal edges, accompanied by a series of smaller blackish spots on the inner, and considerably larger ones on the outer sides; a white band from below the eye through the ear and along the middle of the sides to the groin, also with dark spots or marblings below it; lower side greenish albescent.

*Loc.* Low country S. W. of Kālābāgh on the Indus. The solitary specimen measures 4·7 inches, of which head and body are 1·5 inch.

Although this species much nearer approaches an *Ophiops*, than does *G. microlepis*, the scales are still considerably smaller when compared with those of the small sized *Ophiops*. The presence of a single postnasal seems to be more persistent than might have been expected.

4. *EREMIAS WATSONANUS*. Vide ante, p. 86.

Specimens perfectly identical with those from Sind also occur near Kālābāgh on the Indus. Some of the young specimens have a greater number of white spots on the body than others, and the eyelids, lips below the eye and the entire sides of neck and belly are tinged with orange. The head is, as in young *Acanthodactyli*, comparatively short and high; the nostrils are sometimes almost tubular, and the hinder occipitals occasionally from a suture behind a small triangular median occipital.

5. *HEMIDACTYLUS COCTÆL*. Kálábágh on the Indus.  
 6. " *MACULATUS*. Marri (Western Himalaya, between 7000 and 8000 feet).

7. *GYMNODACTYLUS CASPIUS*, Eichw., vide ante, p. 80.

A female specimen without femoral pores, from the Agror valley, agrees in every respect (except the enlarged chinshields) with Eichwald's figure and description; the fore limb when laid forward reaches beyond the snout with nearly half the length of the third finger.

8. *EUPREPES (TILIQUA) MONTICOLA*.

A specimen from the Saltrange perfectly agrees with those noted on p. 120 of Pt. II. of the Journal for the present year. The occurrence of this species so far West, and in a so thoroughly different climate from that of Sikkim, makes Schlagintweit's precise locality not only doubtful, but it now appears to me very improbable, that the species has at all been obtained in Sikkim.

- Genus. *BLEPHAROSTERES*. Vide ante, p. 74.

As the following new species from the Panjáb agrees in all essential points with the type of the genus, *Bl. Grayanus*, but has a small external opening of the ear, the presence or absence of this character must be excluded from the characteristic of the genus, which is similar the case in *Ablepharus*, and from which *Blepharosteres* differs by the entire absence of eyelids.

9. *BLEPHAROSTERES AGILIS*, n. sp.

Body slender, but less depressed than in *Bl. Grayanus*, and with the tail, when perfect, very much longer than head and trunk together. Head shields regular: one frontal, two post-frontals, not in contact; vertical forms a short suture with anterior frontal, and is either very narrowly truncate or pointed behind; three supra-orbitals, the two anterior occasionally united into one shield, they are followed by two obliquely descending small shields; four occipitals, the anterior pair being united and posteriorly emarginate, in which emargination fits the obtuse point of the median occipital. One post-nasal; a loreal, sometimes confluent with the post-frontal; a nearly complete ring of minute scales round the eye, with two small shields in the place of the pre- and post-oculars; seven upper labials, the fifth entering the orbit; several enlarged temporals, the largest in contact with the post-occipitals. Ear opening distinct, a little above the level of the angle of the mouth, with two small denticles on the front edge, and separated from the last upper labial by two enlarged shields. Six narrow lower labials, with the adjoining chin-shields as usually enlarged.

Six series of scales along the back, including one on either edge, four or five pairs immediately following the occipitals are transversely much elongat-

ed, and occupy the whole width of the neck, as is often the case in *Mococa*. There are twenty-one to twenty-two longitudinal rows of scales round the body, and forty-five or fifty transverse rows between the fore and hind limbs. A pair of moderately enlarged pre-anals; sub-caudals all single.

Third and fourth finger as usually nearly equal, but the fourth toe conspicuously longer than the third; palm and sole entirely granular, and the fingers and toes below with a row of compressed sharp tubercles, exactly as in *Bl. Grayanus*. The fore limb, when laid forward, reaches to, or slightly beyond, the angle of the mouth, and the length of the hind limb varies from one-half to three seventh the distance between it and the fore limb.

*Colour*, above, greenish olive, with or without slight traces of dark spots on the back, but more distinct ones on the tail, edge of back iridescent whitish; sides pale greenish, with a dark band through the eye to the shoulder, becoming narrower farther one and lining the pale edge of the back; remainder of sides with three or four dusky longitudinal stripes, nearly dissolved into small transversely arranged dark spots at the side of the tail, and alternating with white spots; below albescent, somewhat dusky on the tail; limbs pale yellowish, on the upper side with longitudinal brown stripes, below uniform.

Size of a specimen with perfect tail 3·4 inches, head and body being 1·3 inch. I have examined two specimens from S. W. of Kálábágh on the Indus.

This species differs from *Bl. Grayanus* by its well developed opening of the ear, slightly larger number of longitudinal, and transverse series of scales, by a greater number of enlarged scales behind the occipitals, and also by a more regular striation at the sides of the body.

10. *CALOTES VERSICOLOR*.—Marri (Western Himalaya, between 7000 and 8000 feet).

11. *TRAPELUS MEGALONYX*, *vide ante*, p. 88.

About Kálábágh on the Indus; rare.

In younger specimens from both provinces, Sind and the Panjáb, there is very little or hardly any difference in the size of the scales of the back, all of which are larger than those of the sides; while in Günther's figure the dorsal scales appear to differ considerably in size among themselves, but, as all the other characters agree, I do not think that they can represent two distinct species.

12. *STELLIO TUBERCULATUS*. (Comp. J. A. S. B., XLI, pt. II, p. 115).

This species is extremely common all over the Western Himalayas. In younger specimens there is always a conspicuous black band between the eye and the tympanum, and there is also some black round the eye.

13. *STELLIO AGRORENSIS*, n. sp.

General form of the body as in *St. tuberculatus*, but more depressed.

All the head shields, above, are sharply keeled; the nasal is usually anteriorly prolonged and in contact with the rostral; a row of enlarged sharply keeled scales extends from below the eye to above the tympanum; several rows of moderately elongate scales along the upper and lower labials, of each of which there are about ten on either side. Several groups of enlarged spines on the sides of the neck, two or three spines on the upper, and the same number on the front edge of the tympanum. A distinct fold across the throat, with a naked pit in front of each shoulder. Eight or ten rows of moderately enlarged scales along the middle of the back, very much decreasing in size already between the shoulders, but particularly on the neck, where they are almost finely spinulose, divided in the middle by a low crest of distinctly enlarged scales. Scales at the sides of the body very much smaller than on the middle of the back, and arranged in tolerably regular transverse rows; there are no single scales perceptibly enlarged between them, but those on the sides of the middle part of the belly are all enlarged, and the lowest of them exceed in size those of the back. Through this character alone the species is readily distinguished from both, *St. tuberculatus* and *Dayanus*. Scales on the lower side smooth, rather small, generally with a double longitudinal row of enlarged ones along the middle of the belly, and three to five transverse rows on the pre-anal region, where they are spongy or porose in the centre. The scales on the upper side of the fore limb are almost equal among themselves and enlarged, on the hind limb some are, however, considerably larger than others; on the tail they are regularly verticillate.

In specimens which appear to be hardly full grown, I count from one hundred and thirty to one hundred and sixty-four longitudinal series of scales round the middle of the body, and of these there are fifty to fifty-six rows along the belly, the scales being on it conspicuously smaller than in equally large specimens of *tuberculatus* and *Dayanus*. When compared with the former of these two species, the hind limbs of *St. Agrorensis* are decidedly longer. The fore limb when laid backward just or barely reaches the groin, but the hind limb when laid forward fully extends to the eye, or even to its anterior edge. In a perfect specimen of medium size, the tail is double the length of the head and body together.

The general coloration, above, is olive or blackish brown. The head in the very young is marked with more or less confluent yellow spots; the neck and back with three sulphur yellow longitudinal bands, the middle of which continues on the tail; a yellow band commences on the rostral, extends on either side along the upper labials, passes through the lower portion of the tympanum, then across the shoulder and along the sides of the

body to the groin, continuing on the tail. The brown between the five longitudinal bands is indistinctly marked with paler spots. Limbs, above, spotted with yellow; entire lower side yellowish white, with dusky bluish reticulation on the chin and breast, and a dark stripe on the hinder side of the femora. Some specimens measuring up to ten inches still have the coloration of the young, only the yellow on the lips and on the top of the head becomes tinged with olive, and the longitudinal bands with reddish, while the intermediate spots on the upper body are brighter yellow. Other specimens have no trace of longitudinal bands, the entire upper side of the body being brown with more or less confluent yellow spots, as in *tuberculatus* and *Dayanus*, but the spots are larger, and more numerous, than in the two former species. The tail is olive and more or less spotted at the base, dark brown towards the tip; reproduced portions are entirely black, as in the next species.

The largest specimen, out of nine examined, measures 16 inches, head and body being 4.2 inch.

*Loc.*—Sussel pass, at the entrance into the Agror valley, about 6,000 feet high.

14. *STELLIO MELANURUS*. (See Proc. A. S. B., Sept., 1871, p. 189).

I have little to add to Dr. Anderson's description of this species. The median crest exists only on the hind neck, and is composed of two alternating series of enlarged scales. The enlarged scales of the back are broader than long, and give at the first sight the impression of being semilunar; their outermost rows gradually (not abruptly) pass into the scales of the sides, at least they do so in adult specimens. There is no distinct ridge of enlarged scales between the ear and the eye, such as may be seen in the two previous species, or in *Dayanus*,\* but the enlarged scales of the head simply extend on to the region between the eye and the ear.

The young is olive above, yellowish white below; entire head including the chin and front breast reticulated with black; neck, body, limbs and base of tail above with numerous small black and interspersed yellow spots; eyelids and supraciliary ridge yellow; tail dusky black towards the tip. The adults are more brownish olive, with the dark reticulations on the upper head less distinct, the black spots on the body small and more or less confluent, but the yellow spots more brightly coloured, and of much larger size; tail pale yellowish at the base, but for the greater part of its length entirely black.

The largest of three specimens measures: total length 12.5, of which head and body are 4.75 inches.

*Loc.*—Plateau extending from Rāwalpindī towards the Salt Range,

\* I am rather surprised at Dr. Anderson's suggestion (l. cit. p. 188) that my "large scaled form," namely *St. Dayanus*, is an adult of *melanurus*; for Dr. Anderson has not only seen with me young and adult specimens of *St. Dayanus*, but actually compared the type of *St. melanurus* with them.



averaging about 1,000 feet in height; rare, according to Dr. Waagen.—It is most probable that Thcobald's specimen was from the same locality, as he had visited the Saltrange prior to the time, when he presented the type of this species to the Asiat. Soc. Museum.

#### OPHIDIA.

15. *ZAMENIS VENTRIMACULATUS*. Vide ante, p. 82.

Saltrange, and Mt. Sirban near Abottabad, at an elevation of nearly 6,000 feet.

The adults are occasionally coloured uniform olive, with fine longitudinal dark stripes along the scales, becoming better visible, when the epidermis is slightly injured; head marbled with dark, without bands; ante- and post-ocular region and cheek yellow; below yellowish, with or without lateral dark spots on the ventrals. One specimen measures 51 inches, the tail being 12·5 inches; ventrals 214, and sub-caudals 130.

This is probably the same snake which Jan more recently described as *Zamenis persicus*, and which, Günther says, is 'probably = *Z. Chesnei*.' (Zool. Records 1867, p. 140).

16. *TROPIDONOTUS PLATYCEPS*. (Comp. J. A. S. B., xxxix, Pt. II p. 191). Marri, (Western Himalaya, about 6,000 feet).

17. *HAIYS HIMALAYANUS*. Occurring with the last.

#### BATRACHIA.

18. *RANA CYANOPHYCTIS*, (ante, p. 102.)

Marri, (Western Himalaya, about 6,000 feet).

19. *RANA VICINA*, n. sp.

Habit moderately slender, with very long limbs. Skin smooth, at the sides and posteriorly with few scattered, small, tubercles; below, entirely smooth. Snout obtuse, considerably longer than the breadth between the eyes; canthus rostralis rounded; nostrils an oblique slit, almost nearer to the eye than to the point of snout. Tympanum quite indistinct. Tips of fingers and toes distinctly swollen, rounded, not flattened; toes fully webbed, the webs reaching to the tips of the toes, but they are distinctly emarginate. Tongue broadly ovate, slightly emarginate posteriorly. Vomerine teeth in two small groups, the distance between them being equal to that between one of them and the respective choana, the opening of which is about equal in width to one of the groups of teeth.

The colour of the single adult specimen is, above, ashy olive, with the tubercles on the body whitish, a narrow dusky band between the eyes; a black, somewhat interrupted stripe from the pale tip of the snout to the eye, skirting the edges of the eye and continuing as a broader band to the shoulder; lip black, hind-limbs, above, with numerous transverse dark bands (five being on the femur); front and hinder sides of both limbs, involving

the fingers and toes, very distinctly variegated with black; lower lip spotted with black; chin and breast dusky, rest of lower side yellowish white.

Body from tip of snout to anus 2·2 inches, which length is slightly less than that of the femur and tibia together; the total length of the hind-limb being 4 inches, that of the fourth toe barely exceeding half the length of the body, and being only slightly less than the total length of the fore-limb.

*Loc.*—Marri, Western Himalaya, about 6,000 feet.

The great length of the hind-limbs, the very markedly swollen and rounded tips of the toes, smooth skin, absence of the lateral folds, and the broad, slightly emarginate tongue constitute characters which readily distinguish this species from others. In general habitus it resembles *R. Sikkimensis*. (Vide ante, p. 103).

20. *BUFO VIRIDIS*. Near Abottabad, Western Himalaya.

VII.—*The Conquest of South India, in the 12th Century, by Parākrama Bāhu, the great King of Ceylon.*—By J. RHYE DAVIDS, District Judge, Anurādhapurā, Ceylon.

(Abstract.)

Mr. Rhye Davids states that the Dambulla Inscription mentions the expeditions made by Parākrama Bāhu's generals into South India, but no detailed account had yet been published. The history of these expeditions is given in the *Mahāwamsa*, Chapters 76 and 77, a translation of which would be a formidable task, and would occupy too much space, while a shorter account from one of the many trustworthy Siñhalese histories would be useful to those who take an interest in the history and ancient geography of the Dak'hin. For this purpose, the author has chosen the *Narandracharitāvalokana Pradīpikāwa*, which is known to be almost a liberal translation of the *Mahāwamsa*, with many omissions.

The paper mentions incidentally that Parākrama Bāhu struck copper coins. There are three copper coins of Parākrama Bāhu, two given in Prinsep (Mr. Thomas's Edition, I, 419), of which Mr. Rhye Davids knows some twenty or thirty examples, and one very rare with a well-executed lion on the reverse by the side of the standing figure. It also appears that the gold coin with the inscription *Lankeswara*, unassigned by Prinsep, must have been struck by Parākrama Bāhu.

VIII.—*Note on a new King of Bengal.*—By H. BLOCHMANN, M. A., *Calcutta Madrasah.*

(Abstract.)

Mr. Blochmann exhibited the rubbing of an inscription from a ruined Mosque at Kalnah, on the Húgli. The rubbing was communicated by Mr. Walter M. Bourke, and is beautifully taken. Mr. Bourke, a fortnight ago,

sent also an excellent set of rubbings of the Doholdig'hi Inscriptions, Dinájpúr, which were published in the Journal for this year (Pt. I, p. 105), and has promised to favor the Society with a note on the locality where the inscriptions are taken from.

The Kalnah inscription states that the Mosque was founded during the reign of '*Alhuddin Abul Muzaffar Fírúz Sháh, son of Nuçrah Sháh, A. H., 939.*

The reign of this king cannot have been of long duration, and it may be that he only reigned in Western Bengal. The histories extend the reign of his father Nuçrah Sháh to 940, A. H., and then mention Mahmúd Sháh, but make no mention of this Fírúz Sháh (II.), whose name has hitherto been found on no inscription or coin.

Arrangements have been made to secure the stone of this interesting inscription for the Indian Museum.

Mr. Blochmann also mentioned that he lately received a reading of the inscription on Sháh Náfah's Dargáh at Munger, according to which the Dargáh was built in A. H. 902, by Dániál Sháhzádah, son of Sulţán Husain Sháh. A rubbing of this important inscription has been called for. If the transcript is reliable, it would correct two facts, *first*, the beginning of Husain Sháh's reign, which the histories commence from 905, A. H., and, *secondly*, the name of his son, which Prinsep's *Antiquities* (Thomas's Edition, Useful Tables, p. 273) give as "Dulál Ghází, son of Hosain Sháh."

The meeting then adjourned.

## LIBRARY.

The following additions have been made to the Library, since the meeting held in June last.

*Presentations.*

\*.\* Names of Donors in Capitals.

Proceedings, Sessions 1870-71; Transactions, Vol. XXVI, parts II-III.—THE ROYAL SOCIETY OF EDINBURGH.

Transactions, Vol. XIV, part I; Proceedings, Vol. XI, Nos. 84, 85.—THE AMERICAN PHILOSOPHICAL SOCIETY, PHILADELPHIA.

Proceedings of the Royal Society, Vol. XX, No. 183.—THE ROYAL SOCIETY OF LONDON.

Geological Survey of New York, Palæontology, Vol. IV, part I, Fossil Brachiopoda, by J. Hall.—THE STATE OF NEW YORK.

Smithsonian Contributions to Knowledge, Vol. XVII.—THE SMITHSONIAN INSTITUTE.

Second Annual Report, Board of Indian Commissioners.—THE BOARD OF INDIAN COMMISSIONERS, WASHINGTON.

Report of Commissioner of Agriculture, 1869; Monthly Report for 1870.—THE DEPARTMENT OF AGRICULTURE, WASHINGTON.

Transactions, Vol. II, part I.—THE CONNECTICUT ACADEMY OF ARTS AND SCIENCES.

Bulletin, Vol. II, Nos. I-III.—THE MUSEUM OF COMPARATIVE ZOOLOGY AT HARVARD COLLEGE, CAMBRIDGE, MASS.

Journal Asiatique, January, 1872.—LA SOCIÉTÉ ASIATIQUE, PARIS.

Journal, Vol. V, part II.—THE ROYAL ASIATIC SOCIETY OF GREAT BRITAIN AND IRELAND.

Bulletin, Mars 1872.—LA SOCIÉTÉ DE GÉOGRAPHIE, PARIS.

Bulletin, Juillet et Aout 1871.—LA SOCIÉTÉ D'ANTHROPOLOGIE DE PARIS.

Actes, 3e et 4e Trimestres 1870.—L'ACADÉMIE NATIONALE DES SCIENCES, BELLES-LETTRES ET ARTS DE BORDEAUX.

Monatsbericht, Februar 1872.—KÖNIGLICH PREUSSISCHEN AKADEMIE DER WISSENSCHAFTEN ZU BERLIN.

Transactions, Vol. I.—THE INDIAN ENGINEERS' ASSOCIATION, CALCUTTA.

Electricity by Sir W. Snow Harris, translated into Urdu; Political Economy, part in Urdu; Geography, in Urdu.—THE SCIENTIFIC ASSOCIATION OF ALLIQUAH.

The Calcutta Journal of Medicine, January and February, 1872.—THE EDITOR.

The Christian Spectator, June and July, 1872.—THE EDITOR.

Hindu Tribes and Castes in Benares, by Rev. M. A. Sherring.—THE AUTHOR.

The Bengal Reversion, by Major E. Bell.—THE AUTHOR.

Selections from the Kulliyât of Sonda, translated into English.—CAPTAIN M. H. COURT.

Flora Sylvatica, parts 17-21; Icones Plantarum Indiæ Orientalis, part 9.—THE GOVERNMENT OF INDIA, HOME DEPARTMENT.

Report on the Charitable Dispensaries under the Government of Bengal, 1870.—THE GOVERNMENT OF BENGAL.

*Exchange.*

Nature, Nos. 131-134, 1872.

*Purchase.*

The Annals and Magazine of Natural History, May, 1872.—The London, E. and D. Philosophical Magazine, May, 1872.—The American Journal of Science, March and April, 1872.—The Ibis, April, 1872.—The Edinburgh Review, April, 1872.—Revue des Deux Mondes, 15th April, 1872.—Journal des Savants, March, 1872.—Comptes Rendus, 14-17.—The Indian Antiquary, June, 1872.

PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR AUGUST, 1872.

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The monthly general meeting of the Society was held on Wednesday the 7th instaut, at 9 P. M.

T. Oldham, Esq., LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table—

1. From the Editor,—A copy of "Ocean Highways. The Geographical Record," for July, 1872.

2. From the Author,—A copy of 'Panjáb Manufactures,' by B. H. Baden Powell, Esq.

3. From the Author,—A copy of the Report of the Survey Operations in connection with the Right Column of the Lushai Expedition, by Major J. Macdonald, Officiating Deputy Surveyor General.

4. From S. E. Peal, Esq., Sapakati, Assam,—A model illustrating the Nágá method of climbing large trees, and a celt.

The following communication accompanied the donation.—

'I send a small box with a rough model shewing the way Nágáselimb trees, by a bamboo pegged to the stem; I see the subject alluded to in your Proceedings and Journal Pt. I, for 1872, Plate V, and that the Nágá method seems superior to that described by Mr. Wallace, where tying seems needful.

'With Nágás the tying is wholly unnecessary, pegs being driven into the right and left alternately, so that they hold the bamboo rigid. It can neither be pulled away, nor yet be forced against the stem. In other respects, it seems the identical custom.

'I send with the model a peg full size with portion of the node left on as is often done as extra security.

'When newly fixed up, the bamboo is (or ought be) quite rigid and not the smallest vibration possible. In going up, it feels like an iron rod. I have

seen men go up 60 or 70 feet, to rob a bird's nest, but practically there is no particular limit in height.

'They are only precluded from ascending hard, thin-barked, trees, although these can be ascended all the same; still some trees they practically do not try, as they cannot rely on the pegs holding; they would not even hold if tied.

'Bears ascend readily all the trees with thick barks, and tracks are often seen steadily going up the face of a huge Choppa (Sampa), or *Michelia*, 50 and 60 feet high, to get a bee's nest; they as steadily come down the other side.

'Nágás will ascend a large tree, if *thick-barked* and leaning over slightly, and then without any ladder at all, simply notching holes for the toes. Over 3 feet diameter, however, a tree becomes difficult to grasp; but if less than a foot, they seldom even notch it, and I have seen a Nágá go up a Sowah tree, or Caryota palm, his feet holding on merely by the slight leaf scars. The first that tried it failed, and nearly fell when about 40 feet high (became '*winded*' as they say); but another Nágá at once pushed the first one aside on coming down and went up quickly and easily.

'I may just mention perhaps that the huge Mekái trees (*Artocarpus Mekabi*) on the Upper Dihing, in Nám-rúp and the Hills thereabout, have literally hundreds of bee's nests on each, no doubt caused by the fact that neither bears, nor Nágás, can climb them.

'In the box sent, I have also enclosed a celt dug up at Kanoo Tea Factory near me, by Mr. J. W. Donaldson, who immediately gave it me. It was at about 2 feet from the surface in *undisturbed stratified loam*, and found while digging a hole for a tea-house post. Celts are not very uncommon, though not easy to get. The Asamese say they are thunder-bolts. Lightning is said to be of two kinds, 'Hil Sorog' and 'Jui Sorog', and on anything being struck by lightning, they say, "if Hil Sorog, there will be found buried 10 or 15 feet under ground a *stone-axe*!"

'They attach value to them as a means of charming or mesmerising; singularly enough, the superstition, referred to by Dr. Anderson, of the Pandees is common here; for they say these stone axes gradually *rise to the surface*.

'Nágás as far as I can find out, throw them away as far as possible when met with, as things that "belonged to a previous race, with which they have *no business to meddle*."

'For the future I will try and collect them, and attach notes to each and send them to your Society.

'I wish daily that I was living among these people in their hills. I should feel quite at home there, and they would make me so at once, as we now know one another well. I could then work steadily at everything that was of interest among these really strange people.

‘They are far more singular, ruder, wilder, and savage, also more cut up and given to fighting than the tribes towards the Lúshai frontier. Indeed, east and west of a large tract opposite me, the tribes gradually *rise* in civilization. Fifty miles east there is little fighting; the villages are built in close rows of houses, shewing their sense of security, with the eaves almost touching, and no jungle about at all.

‘This same style prevails 50 miles West of me, and also I see at Lúshai villages. But opposite me it is all totally different, for some 30 or 40 tribes or more. These build their houses scattered about on a craggy peak that is naturally nearly inaccessible, and has but one or two pathways. In every village therefore, only 2 or 3, or at most 4, houses can be seen at once and a hunt has to be made for them as it were, leaving ample ambuscade all around from which to surprise any attacking party. A scattered village, therefore, is not only more defensible, but more difficult to attack, loot, and fire.

‘To illustrate my meaning I send a sketch outline of the Kúlún Mútons’ Chang, and have tinted the roofs visible from the plains with yellow ochre. Such a village as this, is quite invulnerable to *Nágás*, and would be far more difficult for us to attack and take than those Lúshai villages evidently were. This village comprises the entire sub-tribe, and is of great extent. To take and ransack such a place in a short time would be simply impossible. And at the slightest alarm, every soul could be instantly secure and invisible. A much larger force would be needed to surround it, in fact that would be also impossible, and thus there would be plenty of time to rally, and ground to rally on, if an attack were made on any point.

‘About the tattoo marks, you say that in Col. Dalton’s book there is a *Nágá* chief from south of Sibságar who is not tattooed. I only know of one tribe, and by hearsay too, that does not tattoo in some way. Some tribes do not tattoo on the face; but it is general all over the Hills near me for the reasons assigned. The proof indeed is clear enough, because there are exceptional cases of untattooed *Nágás* here and there—men who have *not got a head*, or men who are cowards naturally, or may have been warned by their bad luck, when tried by eggs, that they would get killed themselves.

‘Lads are often untattooed till the age of eighteen and twenty, but seldom untattooed after that age.

‘Among the Angáms I cannot say if tattooing is common or not. Nor can I say if the Rengmá *Nágás* do or the Satú *Nágás*. The *Nágás* east of the Dihing River do not tattoo, I think, neither do they take heads. They are under the Singphús, who are responsible to us for their good behaviour.

‘As to the *Nágáni* (Pl. VI of the Journal) being too good looking,



she is for the average run of them, but some again are still better. Indeed, a full length life size figure of a good one in oil, with all the beads, bracelets, dyed goat hair, shells, &c., being in lieu of costume, would create a perfect *furor* in the Royal Academy any year.'

5. From Col. J. H. Haughton, C. S. I.,—A brass sleeve link bearing an Arabic inscription.

6. From Captain W. G. Hughes, Superintendent Hill Tracts, Aracan,—A facsimile of a copper plate inscription found at Karennee.

The following letter accompanied the donation.

"I have enclosed under cover a brief notice and a facsimile of a remarkable plate, which exists in the country of the non-tributary tribe of Karens of Western Karennee under Chiefs Koonte, and for which I have to thank the Rev. Mr. Bunker, a Missionary stationed at Tounghoo. It was forwarded me when I was Officiating Deputy Commissioner of Tounghoo District, and perhaps as the characters would appear to be unknown, a notice of it in the Society's papers might lead to some useful result, and throw some additional light on the history of that portion of the country inhabited by wild tribes."

Mr. Bunker's note is as follows—

"Enclosed please find the copy of the metallic plate which I found in Karennee on my last journey to that country.

"This plate is formed of mixed metal which resembles gold and copper, one half gold, *i. e.*, one half of the transverse axis of the plate, while the rest resembles copper,—the two joined together showing an irregular line through the length of the plate. The jealousy of the chiefs would not allow a very careful examination, hence there is much uncertainty as to the real character of the metal. The plate is six inches long by two in width, and about one-fourth of an inch in thickness. It is engraved with the character, the copy of which I enclose, on both sides of the plate. The cutting of the letters is clear and deep, but the slips of the chisel in engraving, are many, showing a hand not greatly skilled in such work, yet compared with the ordinary skill displayed by natives of this country, it may be pronounced excellent.

"The traditions of this plate are very many, extending throughout all the tribes of Karens from Tounghoo to Mergui. Of course, these traditions take different forms among different tribes, but they manifestly point to this, or a similar plate, as their origin.

"The Red Karen chiefs and old men themselves know nothing of the origin of this plate further than their traditions. Evidently the plate came into the possession of the Karennee chiefs, before the remembrance of any man now living among them. They say that it has been handed down from chief to chief from most ancient times, and of course, they

surround it with all the mystery they can. Hence they say that 'the Great God gave it to them in most ancient times.'

"This plate, whatever be its origin, exerts a great power over the common people. In fact, the chief owes much of his authority over the people to this plate. Also most of the revenue which comes to him from the people is derived indirectly from this plate.

"They hold the plate in great fear and reverence. The common people have never seen it save on great feast days, and then but few are so bold as to look upon it, as they say it will blind them by its glory. They also believe that it possesses life, and assure me that it must be fed with its own peculiar food, or else great suffering will come upon the people. Now it happens that the food most pleasing to it is *silver*;—after this, meats and rice. Once in a year the whole nation assemble to feed their plate, and so the chief receives quite a revenue from this custom alone.

"It was with great difficulty that we obtained a sight of the plate, so great is the fear of the chiefs. At the time, we asked for other plates, which we had reason to suspect were in their hands, but they denied the possession of them. But I have learned since that there is at least one more, of silver, and several of ivory, which I hope to obtain by and by.

"Hoping some one may be found who will be able to decipher this character."

7. From the Government of Madras, Revenue Department,—Copies of the Survey of the site of the Rock Inscriptions at Jogáda Naugám in the Ganjám District, and of Mr. Grahame's transcripts of the inscriptions, with a set of the papers relating to them.

8. From the Government of India, Public Works Department,—A copy of the correspondence, regarding a recent accident from Lightning at Landour.

The Secretary read the following memorandum accompanying the correspondence.

"At about 10 P. M. on the 19th instant, in the midst of a severe thunder-storm, the Orderly Room was struck with lightning at the ridge, and the thatching was set on fire, which was extinguished with great difficulty at about 11.30; or in an hour and a half afterwards.

The electric fluid forced a passage down the gable of the cross wall, to the top of the door, and thence in a zigzag direction, to the bottom of the main wall, through which it passed underneath at the foundation, into the verandah, where it exploded, upheaving a portion of the pucca terraced flooring, to the depth of more than one foot, with a diameter of about two. At, and adjacent to, the spot where the explosion took place, the verandah had been excavated to a depth of about 2½ feet, and moist earth *only* was found, hence it is concluded, that the charge must have been extra-

ordinarily great, not to have been *wholly* absorbed by the extreme dampness of the earth. That a part of the electric fluid only exploded, there can be no doubt."

The following gentlemen duly proposed and seconded at the last meeting were balloted for and elected Ordinary Members—

Bábu Vipinavíhári Mukerji.

Capt. F. St. Quintin Clutterbuck.

P. Dejours, Esq.

Rev. Laurentius O. Skrefsrud.

H. Beverly, Esq., C. S., (for re-election).

The following are candidates for ballot at the next meeting—

C. P. Gordon, Esq., proposed by L. Schwendler, Esq., seconded by Dr. F. Stoliczka.

Lieut. W. A. Holcombe, Mánbhúm, proposed by Dr. J. A. P. Collis seconded by Capt. W. L. Samuells. .

Lieut. W. S. S. Bisset, R. E., proposed by Col. H. Hyde, seconded by H. Blochmann, Esq.

E. H. Man, Esq., Port Blair, proposed by G. E. Dobson, Esq., M. B., seconded by J. Wood-Mason, Esq.

The following gentlemen have intimated their desire to withdraw from the Society

Major J. M. Graham.

C. B. Saunders, Esq., C. B.

M. L. Ferrar, Esq., B. A., (*On leaving India.*)

The President announced that His Excellency the Viceroy and Governor-General of India, had been pleased to accept the office of Patron of the Society.

The following letter from the Private Secretary to the Viceroy was read—

"I am directed to acknowledge the receipt of your letter of the 24th ultimo, requesting on behalf of the Council of the Asiatic Society, that the Viceroy and Governor-General would consent to accept the office of Patron, and to state in reply that His Excellency feels much honoured by the offer conveyed in your letter under acknowledgment, and has much pleasure in acceding to the request of the Council."

Bábu Rájendralála Mitra sent for exhibition Electrotypes of two ancient seals procured for him by Col. G. Pearse.

The following communication from Bábu Rájendralála Mitra regarding them was read—

"The electrotypes have been taken from two ancient seals in cornelian in the possession of Col. G. Pearse. The characters on them are of the Shah type, and as old as the Christian era. I read them *salyá* सल्या, a feminine name, the wife of Salya, or 'a water-nymph,' from *sala*, water. In the Mahábhárata a name very like it occurs as that of the maternal uncle of Yudhishtira, but it begins with the palatal *s'*, and the name of the owner of the seals was, of course, a different and much later personage.

"The first syllable *sa* is undoubted; so are the *l* and the final long vowel *á*; but the *y* is a puzzle. At first, I took it for a *z*, त; but I am now disposed to read it as a *y*. The figure at the end of the line is a star or full stop, and not a letter."

The Philological Secretary read the following letter from Bábú Káshínáth, Head Master, Anglo-Vernacular School, Sirsá, Alláhábád, regarding Rájá Todar Mall.

"I read with much interest and pleasure the letters from Mr. M. L. Ferrar and Maulaví Muhammad Husain of the Láhore College and your own remarks regarding Rájá Todar Mall, which appeared in the Proceedings of your Society for February 1872. Being a *Tundun* K'hatri, the same caste to which the Rájá belonged, and a resident of Ágrah, I beg to offer a few remarks on that distinguished minister of Akbar, which I hope you will lay before the next meeting of the Society.

"Maulaví Muhammad Husain says that Rájá Todar Mall could not have been a Káith, because the syllable *Mall* is never used by that caste. But the syllables *Mall*, *Dás*, *Prásada*, *Rám*, are not peculiar to any particular caste or clan in Upper India; they are equally applicable to all Hindús. The Rájá being a K'hatri is quite certain from historical and traditional evidence, and to call him a Káith, seems to be an unconscious mistake on the part of the editor of Elphinstone's History of India.

"In para. 2 of his letter, the Maulaví says, "There is a Mahallah in Ágrah, where the funeral ceremonies (النهائي) are performed by all K'hatri, and every one there knows that it was the Mahallah where Todar Mall used to live. In fact he had chosen his residence there, in order to be present at the funeral ceremonies of members of his caste." Ágrah is my birth-place, but I am not aware of the existence of such a Mahallah. There are three Mahallas only (Máithán मीथान, Pannigali पन्नगली, and Chattá चत्ता) and which are solely inhabited by K'hatri, and which are as old as Akbar's time, containing two temples of white and black marble, consecrated to Mahádeva built by a K'hatri named Ráison Dás, who is said to have been a *mutaṣaddí* at Akbar's court. There is an open space just in front of Mahallah *Chattá*, now occupied by a *túl*, where a funeral ceremony peculiar to us is up to the present time performed by K'hatri. When

all have returned from the burning ghât, the chief mourner saluting each brother, bids him go home. The plot of ground is associated with the following curious tradition. Once there stood at that place the house of a proud K'hatri, who used to send his shoe instead of personally attending at the funeral obsequies, when a member of his caste had died. It once happened that a person of his family died. No brother, however, came to take the dead to the ghât, but each sent his shoe, as the proud K'hatri had done. It must be borne in mind that it is considered a disgrace, not only among K'hatriś, but also among other higher castes of our country, to allow the dead to be touched by other hands than those of one's brethren; and the K'hatri being thus humbled, went from door to door, repenting his past follies and asking for forgiveness. Though all yielded to his entreaties, it was resolved as a lasting punishment for him that the K'hatriś of Agra should henceforward perform the funeral ceremonies before his house, and since that time the present custom has been in force.

"A tradition among us says that though Rājā Todar Mall was one of the first men in the Empire, favoured by the Emperor and the princes, he was never unkind even to the poorest of his caste. The following I often heard cited as an example of his modesty. On the occasion of the marriage of his son, he distributed among K'hatriś *gendorās* (cakes made of sugar only) with a valuable jewel placed on each. His servants forgot to present the usual share (भान्ना) to a very poor man, who, thereupon, complained to his friends. When the complaint reached Todar Mall, he immediately went barefooted and bareheaded to the door of the man with double the share, humbly begging his pardon."

Also a letter from W. M. Bourke, Esq., regarding the localities in which the Dinājpur inscriptions published in Journal, Part I, for 1872, p. 102, were found.

"The description given by Buchanan of the ruins at Gangarāmpūr is not in accordance with their present appearance. The ruins now consist of an outer oblong chamber, its length being from east to west. There are three doors on the south side of this chamber facing the tank mentioned in Mr. Blochmann's notice of Gangarāmpūr, Dinājpur, published at p. 102, Part I, of the Society's Journal for this year. Opposite the central door is a door opening into a square inner apartment, in which there is a plain earthen grave, over which a cloth is spread as a mark of reverence. There is no vestige of a roof on any part of the building; but the walls are standing, except at the western end of the oblong chamber, which has fallen. Here a column, still erect, and many detached stones beautifully carved unmistakeably indicate Hindú workmanship.

The present position of the inscriptions, taking them in the order given on page 103 of the Journal, is as follows: The *first* is over the inner

door abovementioned; the *second* is to the right of that door. The *fourth* is to the left, and the *fifth* is to the right of the easternmost of the three doors on the south face of the building. A heap of rubbish covers the wall almost to the level of the base of the last mentioned inscription; but there is no appearance inside the chamber at this place of a door, nor is there anything indicating that there was a vault there. The Muhammadan custom of building into the walls of ruins inscriptions that have fallen or become detached might account for the altered position in which the inscriptions are now found from what they are described by Buchanan to have occupied nearly forty years ago, were it not that there is no new masonry, nor any break in the courses in the walls round the inscriptions, or indeed in any part of the walls. I made a careful enquiry from the person in charge of the ruins, and from other persons living in the vicinity, but they had no knowledge of any other inscription than the four abovementioned ever having been seen at the place. This was in the month of June last.

"The translation published by Thomas, and which he received from Col. Nassau Lees was made by the latter from a rubbing of the inscription numbered I., by Mr. Blochmann, taken by me in 1868, and then shown to Col. Lees. The Kai Káús Sháh mentioned in that inscription is referred to in the Society's Journals for 1864, page 579, and for 1867, page 40. It will afford me much pleasure if the rubbings of the Gangarâmpûr inscriptions which I took last month will resolve the doubt expressed by Mr. Blochmann, in the translation of his No. I inscription, or supply the date wanting in the rubbing furnished him of his No. IV inscription."

The President laid before the meeting a copy of Dalton's "Descriptive Ethnology of Bengal," and remarked that the editing of these papers had been undertaken by himself and Mr. Blochmann, at the latter end of 1870, at the request of the Council. The work had been some time in press owing to various causes, and to the delay which must necessarily arise in getting so many and such excellent lithographic illustrations executed, but the Editors had now much pleasure in laying a complete copy before the Society.

The following papers were read—

I.—NOTE ON A FEW BURMESE SPECIES OF SAURIA, OPHIDIA AND  
BATRACHIA,—by DR. F. STOLICZKA.

I have lately received from Mr. Theobald a few very interesting species of Reptiles and Amphibians, collected by him in various parts of Pegu and near Moulmain in the Tenasserim district. There is a new species of worm- or blind-snakes among the Moulmain specimens, and the examination of excellently preserved specimens of Blyth's *Megalophrys guttulata* and *En-*

*gystoma? interlineatum* suggested the separation of these species into two new genera.

Under the present remarks only those species are included, which yielded any additional information, or which have not formerly been known to occur in Burma. Many others had already been fully reported by Mr. Theobald in his Catalogue of Burmese Reptiles, published in Vol. X, Zoology, of the Linn. Society's Journal.

#### RIOPA LINEOLATA.

Stoliczka, J. A. S. B., Vol. xxxix, pt. II, p. 175, pl. x, fig. 2.

In a specimen from Moulmain, three inches long, the longitudinal series of scales round the body vary from 22-23, and there are 68 transverse rows between the fore and hind limb. There is a pair of anterior occipitals, the two being divided by an oblique suture, each of them is very little larger than the median occipital. The lower eyelid is occupied by a single, large, semitransparent shield.

#### RIOPA CYANELLA.

Stoliczka, J. A. S. B., Vol. xli, pt. II, p. 130, pl. v, fig. 3.

Mr. Theobald brought several specimens of this rare species; some are slightly stouter than others, but all agree in every point of structure, and differ by their longer and slenderer limbs, and by their coloration, from *R. anguina*, as formerly recorded.

The pale golden band along the edge of the back is sometimes (though rarely) equally distinct throughout its length. The coloration of the back varies from pale olive brown to brown with a golden lustre, while the sides always appear to have a bluish tinge, and numerous pale turquoise spots on the sides of the neck and behind the shoulder. The longest specimen with a perfect tail measures 4·7 inches, the head and body together being two.

#### HINULLA INDICA.

Comp. J. A. S. B., Vol. xli, pt. II, p. 122, pl. iv, fig. 1.

A single specimen of this Sikkim form was obtained by Mr. Theobald near Tonghui in Pegu, but it is evidently very much rarer than the smaller *H. maculata*.

#### TYPHOLOPS BARMANUS, n. sp.

Body rather short and stout, the circumference being between one ninth and one tenth of the total length; head distinctly depressed, oblong, much broader than the posterior neck; eyes very distinct, bluish black, with round white pupils. The rostral is slightly broader above than in front, its width on the upper surface equalling one third of the head; it reaches far back to a line connecting the anterior edges of the eyes and is obtusely rounded; nasal separated from the fronto-nasal by an extremely fine, short suture; the fronto-nasals just touch each other behind the rostral in a point; pre-ocular strongly curved forward; four upper labials, from the first gra-

dually increasing in size; first smallest, in contact with the nasals, second in contact with nasal, fronto-nasal and prefrontal, third with the last and ocular, fourth only with the last. None of the head-shields above are markedly enlarged; the prefrontal and supraoculars are sub-equal and slightly exceed the others in size; the parietals are conspicuously narrower than the supraoculars. All the head-shields are very finely porose; the other scales perfectly smooth, in 24 longitudinal rows round the body, in about 300 transverse rows counted along the side of the body, and in ten round the tail; the length of this last is less than the width of the head, it is slightly curved and terminates in a very sharp point.

Vinaceous black above, paler at the sides, yellowish below, the dark coloration very irregularly encroaching upon the yellowish space; snout in front pale yellow, the head-shields near the edge bordered by pale crenulated lines, the other scales slightly paler at their bases than towards their margins.

Total length of the single specimen 4.5 inches, the head including the widened fore neck 0.25, and the tail 0.14 inch.

*Hab.*—Near Moulmain.

The flattened, broad head, short and thick body, and the very close approximation of the fronto-nasals behind the rostral, readily separate this from *T. Siamensis*, and other known species.

#### SIMOTES CRUENTATUS.

Theobald, Cat Rept. Asiat. Soc. Mus., p. 47, and Rept. Brit. Birma, Linn. Soc. Journ., Zool., x, p. 41.

There always appear to be *eight* upper labials present, and *not seven*. The head, particularly in the young, is much flatter, than in most other species of this genus, and the markings on the head also slightly differ. The frontal band connecting the anterior edges of the eyes is regular, and there is always a broad dark collar present with an anterior zigzag edge; from its short, outer branches proceeds a somewhat undulating, obtusely angular band forward, the angle extending to between the eyes; this band is in the young dissolved into spots, and the snake has then very much the aspect of an *Ablabes*. In the young also there are three complete black rings round the tail, one at its base, the second at two thirds its length, and the last, the smallest, just in front of the white tip; in the adult these rings generally become obsolete, except a black broad cross bar just behind the vent.

#### RANA KUHLII.

Several specimens were collected by Mr. Theobald in the Karen hills east of Tonghú at 2,000 to 3,000 feet elevation. The length varies from three quarters of an inch to two and a half; the skin is soft, rather loose, and slightly tubercular, not transversely corrugated, except it



is made to appear so by straightening the body after it had been hardened in spirit in a bent position. The upper coloration is brown with a rufous tinge and with numerous dark spots; there is generally a pale band from the eye to the angle of the mouth, bounded posteriorly in its entire length by a fold of the skin. Very young specimens have the toes comparatively less fully webbed than adults.

*CALLUELLA GUTTULATA*, (Blyth,) (n. gen.)

Comp. *Callula guttulata*, apud Günther in Proc. Z. S. Lond. for 1868, p. 490, pl. 40, fig. 1.

Although this species externally most closely resembles the type of the genus *Callula*, *C. pulchra*,—except in having the tips of fingers and toes scarcely swollen, instead of dilated,—it essentially differs by having two very distinctly toothed ridges extending from behind the choanæ towards the centre of the vomer and also by the toothed maxillaries and intermaxillaries. An adult specimen of about the same size as the one figured by Günther shews these characters very distinctly, but in young ones these denticulations are scarcely or very deficiently traceable. I have examined a large series of *Callula pulchra*, but as none of them shew any teeth on the vomer or on the maxillaries, a generic separation of the present species appears to me justified. Its characters are:—

*Calluella*. Habit stout; head and gape of mouth short, maxillary and vomerine teeth present, choanæ and openings of eustachian tubes small, (two folds across the palate, lower jaw with two prominences); tongue entire, free behind; fingers free, toes webbed, both with truncated, but not swollen tip; metatarsus with an inner shovel-like prominence; processes of sacral vertebræ dilated; tympanum hidden.

Type: *Calluella guttulata*, (Blyth,) from Pegu.

Blyth, when originally describing the species as a *Megalophrys*, must have noticed the maxillary and vomerine teeth, and was, therefore, not very wrong in his determination, but his description is so insufficient, that I would have hardly ventured to identify the present species with it, had Dr. Günther not done so. *Calluella* appears to connect *Pyxicephalus* with *Megalophrys*, differing from the former by the entire tongue and from the latter by the absence of cutaneous prolongations on the eyelids. It evidently belongs to the family *Dicroglossidæ*.

*BERDMOREA INTERLINEATA*, (Blyth,) (n. gen.)

*Engystoma? interlineatum*, Journ. A. S. B., 1854, Vol. xxiii, p. 732, and Vol. xxiv, p. 720, and Anderson in Proc. Zool. S. Lond. for 1871, p. 202.\*

Anderson's re-description of Blyth's species requires an addition. Both, in the type and another specimen collected by Theobald in Pegu, the skin above is not only porose, but throughout distinctly granular, and the tym-

\* Both the quotations here given from the Asiat. Soc. Journ. are misprinted.

panum is distinctly exposed. These characters coupled with the presence of palatal ridges necessitate a generic separation from *Diplopelma*, and I propose to name it after the first discoverer, Major Berdmore.

*Berdmorea*. Habit Bufonine, with proportionately short hind limbs; head moderate, triangular, fingers free, toes webbed, tips of both very slightly swollen, truncate, heel with two small tubercles; skin granular; tympanum distinct; eustachian tubes rather large, tongue entire; maxillaries sharp, edentulous, intermaxillary not ossified; an interrupted fold of skin behind the choanae, and two others further on on the palate, both papillose but the posterior much stronger than the anterior; sacral diapophyses dilated.

Type: *Berdmorea interlineata*, (Blyth), from Pegu.

The live animal is one of the most beautifully coloured frogs. The entire body is strongly tinged with vinaceous red, paling to golden yellowish on the lower belly. The two longitudinal dorsal bands are sometimes not very conspicuous on account of the entire upper surface being reticulated with narrow vinous brown bands; the large round spots in front of the bases of the femora are deep purplish black, encircled with golden yellow. The sides are also purplish black near the edge of the back, but the colour shades into purplish towards the belly; lips, throat and breast rich vinaceous.

The fold across the occiput in the type specimen, re-described by Dr. Anderson, appears to be accidental, for another beautifully preserved one does not shew a trace of it. Length of body 1·8, hind limb measured from vent 2·1, fore limb 1·1 inch.

*Berdmorea*, according to the type species noticed, cannot be classed with *Diplopelma*, nor with *Callula*, and it differs from any of Cope's or Peters's genera which I can trace. The general appearance of the frog with its long body, triangular head and comparatively short limbs is rather that of a *Phryniscus*, than of a *Diplopelma*. Mr. Theobald tells me that the species lives under large stones and its movements are as sluggish as those of a *Bufo*, or *Callula*, while *Diplopelma* (as observed in *carnaticum*) is a powerful leaper, living near water or in the damp jungle. The fore limbs of *Diplopelma* are proportionally much shorter and the hind limbs much longer; the latter attain their greatest length in *D. Berdmorei*, which, as I stated, (ante p. 110) also differs from the typical species, *D. pulchrum*, by its fully webbed toes, terminating with much dilated tips. Whether this character is sufficient for a generic separation of the species in question, I am not prepared to say without an examination of the several South Indian *Diplopelmata*.

II.—ON A NEW SPECIES OF *REGULOIDES*,—by W. E. BROOKS, C. E.,  
Assensole.

I have, for the last six years, procured specimens of a *Reguloides*, which is not uncommon in the North-West Provinces during the cold weather. This bird I took to be *Reguloides viridipennis*, Blyth, as far as I could judge by the brief description given in Dr. Jerdon's work. Recently, I have had the pleasure of examining Mr. Blyth's type birds of this species, and of reading his original detailed description of it in the Journal of the Asiatic Society, Vol. xxiv, p. 275; and I find it to be a species strongly resembling *Reguloides trochiloides*, Sundevall, but considerably smaller, and rather brighter coloured. I shall, therefore, call my hitherto undescribed bird

*REGULOIDES SUBVIRIDIS*, n. sp.

*Description*.—Above dull light olive green, with the rump and upper tail coverts a shade or two lighter; but not yellow white and abruptly defined, as in *Reguloides proregulus*. Lower surface dull albescent, tinged with yellowish. Wings and tail brown; the primaries, secondaries, and tail feathers, edged with light olive green; and the tertials with broad whitish margins as in *Reguloides superciliosus*, but to a rather less extent. The greater or secondary wing coverts are brown; broadly tipped with dull yellowish white, which forms the *second* wing bar. The smaller wing coverts are edged with light olive green, but the lower, or last row, are tipped with dull yellowish white, which forms the upper or *first* wing bar. I need hardly observe that in all *Reguloides*, the first wing bar is very narrow, and the second one is very broad. The coverts to primaries are brown, of a darker shade than the quill feathers, and form a darkish patch beyond the second wing bar. The wing is thus, in its whole appearance, extremely like that of *Reguloides superciliosus*. On the crown of the head is a very distinct coronal streak, similar to that of *Reguloides proregulus*, and of the same dull yellow colour. The supercilium is yellow and brighter anteriorly. The cheeks are yellowish, faintly mottled with pale brown. A brownish streak passes through the eye. Irides dark brown. Bill brown, and light yellow brown on lower mandible, except the tip, which is dark, as in the upper one. Legs and feet brown.

Length, 4 to 4.25 inches, according to sex; wing 2.2 to 2.3 of the male, and 2.0 to 2.05 of the female; tail 1.7 to 1.83 of the male, and 1.5 to 1.7 of the female; bill at front .3; tarsus .65 to .7.

The 4th quill is generally the longest; 5th a shade shorter; 3rd shorter than 5th, and intermediate between it and the 6th; 2nd equal to 8th; but sometimes intermediate between 8th and 9th. The 4th and 5th are

rarely equal; and still more rarely is the 5th the longest in the wing; the 1st quill is from 1·17 to 1·08 short of tip of wing, according to sex.

The general tone of colour is strikingly like that of *Reguloides proregulus*, Pallas, but paler and duller; and it differs from that bird in not having a yellow rump band; also in its more slender and much lighter coloured bill. From *Reguloides superciliosus*, Gmel., it differs in having the supercilium of a decided yellow, while that bird's is ruddy white or pale buff; and its cheeks are of the same colour but duller mottled with light brown. Our new bird's cheeks, on the contrary, have generally a strong yellow tinge; its coronal streak too is bright and well defined as in *Reg. proregulus*; while the coronal streak of *R. superciliosus* is seldom visible and when so, is merely a faint brownish grey line on the dark olive brown head, which can only be seen when looked at in certain lights. The indistinctness, or entire absence, of the coronal streak is one of the characteristics of *Reguloides superciliosus*. All the others, except *Reguloides castaneiceps*, have the coronal streak very distinct. In our new species, the plumage is very soft and lax; and however carefully the skin may be put up, the coronal streak gets disturbed and out of place.

Unlike the purely hill *Reguloides*, *R. proregulus*, *R. erochroa*, *R. maculipennis*, and *R. castaneiceps*, our bird is migratory, and frequents the plains of the North-Western Provinces during the cold season. The four species which I have just mentioned find the lower Himalayan hills quite warm enough for their winter retreat.

"The call note of our species is peculiarly shrill, tinkling, and weak, but quite Phylloscopine; a "tiss-yip," as expressed by Mr. Blyth. There is a greater rise between the 1st and 2nd notes of the call (the 2nd being the highest), than there is in the call note of *Reguloides superciliosus* or of *Phyllopneuste trochilus*.

The song, which I have sometimes heard on their arrival, is a pleasant twittering but feeble one, and very like that of *Regulus cristatus*. I have procured *Reguloides subviridis* in the Etawah and Cawnpore districts, but I have no doubt it is generally spread over the whole North-West. In Kashmir I never met with it, although *R. proregulus* and *R. superciliosus* were abundant there.

It arrives in the plains about a month later than *R. superciliosus*, and while that species loves large and shady trees, our one seems to prefer those of light foliage, especially the Babool. With one or two exceptions, all my specimens were procured in Babool trees. The banks of the Etawah branch of the Ganges canal abound with these trees, and there this little bird is not uncommon. It is not an abundant bird like *Reguloides superciliosus*, but is comparatively scarce; and its peculiar and excessively shrill note enabled me to find the numbers I did. It only calls occasionally, and is as silent a bird as *R. superciliosus* is noisy.

I regret that I have given *Reguloides subviridis* to many of my friends under the mistaken name of "*Reguloides viridipennis*;" most of them, however, will see this notice, and will be able to make the necessary correction.

I might observe that neither *Phyl. trochilus* nor *Regulus cristatus* occur in India. I procured specimens of *Regulus Himalayensis* in Kashmir which are notably distinct from *Regulus cristatus*.

III.—NOTES ON A COLLECTION OF BIRDS MADE IN THE ANDAMAN ISLANDS BY ASSISTANT SURGEON DOBSON, M. B., DURING THE MONTHS OF APRIL AND MAY, 1872,—by V. BALL, ESQ., B. A.

(Abstract.)

The collection contains 184 specimens belonging to 62 species, of which 19 have not been previously recorded from the islands. One species only, a *Graucalus*, is described as new; there are four others, however, which differ somewhat from the types of the species to which they are referred, but in the present collection they are only represented by single specimens, and are treated of as being possible individual varieties.

Several of the Andaman species have only been named hitherto. In this paper, descriptions have been given, so far as is possible from the material afforded by the collection.

The avi-fauna of the Andamans, as at present known, includes 101 + 4? specimens. Of this number, 12 are local, and 6 are confined to the Andamans and Nicobars.

In the Andamans the principal portion of the non-local species are Indian, while in the Nicobars they are Malayan.

IV.—ON THE LAND-SHELLS OF PENANG, WITH A DESCRIPTION OF THE ANIMALS AND WITH ANATOMICAL NOTES,—by DR. F. STOLICZKA.

(Abstract.)

The author alluded to the paucity of land-shells which up to the present time had been known from Penang, or Prince of Wales island. During a visit to the island in 1869, he had collected nine species of CYCLOSTOMACEA, and seventeen of HELICACEA. The majority of them are new, except *Cyclophorus Malayanus*, *Megalomastoma sectilabrum*, *Helix (Rhysota) Cymatium*, *H. similis* and a few others.

Among the CYCLOPHORIDÆ, the author particularly noticed the genus *Lagocheilus*, (Theobald), of which two new species had been found, and the animals of both possess a long glandular slit on the upper hinder end of the foot. Thus *Lagocheilus*, together probably with *Dermatocera*, will take a similar systematic position among the CYCLOSTOMACEA, as the *Zonitidæ* have among the HELICACEA.

The paper together with illustrations will appear in the Journal of the Society, Part II.

V.—ON NEW AND LITTLE KNOWN SPECIES OF PHASMIDÆ, PART I, genus *BACILLUS*,—by J. WOOD-MASON, Esq.

The author exhibited the species described by him, together with numerous excellently executed drawings.

VI.—ON *NEPHROPSIS STEWARTI*, A NEW GENUS AND SPECIES OF MACRUROUS CRUSTACEANS, DREDGED IN DEEP WATER OFF THE EASTERN COAST OF THE ANDAMAN ISLANDS,—by J. WOOD-MASON, Esq.

The interesting macrurous Crustacean described in this paper is closely allied to *Nephrops Norvegicus* of Northern European seas, so closely allied, indeed, that were it not for the absence of the squamiform appendage of the antennæ, it would have to be placed in the same genus as a second species. The absence of this appendage rendered necessary the establishment of a new genus for its reception. The discovery in these warm seas of a very close ally of so characteristically a northern species, remarkable though it was, would appear less surprising, when the fact, that this Crustacean lived and burrowed in the mud of the sea-bed at a depth of nearly 300 fathoms in a temperature not exceeding 50° Fahr., came to be considered. The chief point of interest attaching to this new form lay in the loss of its organs of vision from disuse, as in *Calocaris MacAndrewæ*, Bell, and *Cambarus pellucidus*, and the other Crustaceans of the Mammoth Cave; and in the increased length of the antennæ and development of the basal joints of the antennules in which the auditory organs are lodged,—modifications which the author regarded with Mr. Darwin as produced by natural selection in compensation for blindness.

VII.—NOTES ON THE ASIATIC SPECIES OF THE GENUS *TAPHOZOUS*, GEOFF.,—by G. E. DOBSON, B. A., M. B.

The Asiatic species of the genus *Taphozous*, Geoff., described by Temminck in 1841, were four in number, viz.,—*T. saccolaimus*, Temk., *T. longimanus*, Hardw., *T. melanopogon*, Temk., and *T. bicolor*, Temk. Several specimens of the last named species are said by Temminck,\* to have been sent from Calcutta, but up to the present time the only specimens obtained at Calcutta, or in any other part of India, agreeing with the description of this species, have been young females of *T. longimanus*, or *T. melanopogon*. As *T. longimanus* is the only species of the genus common about Calcutta, the specimens described by Temminck under the name of *T. bicolor* were

\* Monograph. de Mammal. II, p. 290.

probably not quite adult females of the former species. This supposition is strengthened by the fact first noticed by Blyth, that the colour of the fur of *T. longimanus* passes from brown in the young to black in the adult animal. The colour of the fur, as described by Temminck, and indicated by the specific name, of very little specific value in the description of any species of bats, is in this genus of still less importance, as the several species resemble each other almost exactly in this respect.

Regarding *T. bicolor*, therefore, as synonymous with *T. longimanus*, the Asiatic species of the genus known in 1841, were three only, which correspond with the list given by Blyth twenty years later.\* A period of thirty years has now elapsed, since 1841, and no further addition has been made to the number of species.

On carefully examining and comparing the specimens of the species of the genus in the Indian Museum, I found two, male and female, in a bottle labelled 84, d. & c., corresponding in Blyth's catalogue to *T. saccolaimus*, Temk., from Tenasserim, presented by Mr. Theobald in 1855. The absence of the gular sac in both specimens at once showed me that they had been wrongly determined, and on further examination I found that they were distinct from all hitherto described species of *Taphozous*.

I purpose naming the species after Mr. Theobald who has contributed during many years to the collection of *Chiroptera*, in the Indian Museum, and has lately added a most valuable collection of bats made by him in Pegu.

#### TAPHOZOUS THEOBALDI, n. s.

Gular sac absent in both male and female; ears larger than in any hitherto described species of *Taphozous*, inner margin bordered by a row of small papules. Radio-metacarpal pouch† well developed, larger than in *T. saccolaimus*. Wing and interfemoral membranes, on the upper surface, completely naked. Length (of a female) head and body 3·35; tail 1·35; ear (anteriorly) 1·1; forearm 3·0; second finger 4·7; fourth finger 2·5; tibia, 1·15.‡

In the Proceedings, Asiatic Society of Bengal, for last month, in the abstract of Dr. Stoliczka's paper—"On the Mammals and Birds inhabiting Kachh" reference is made to a new species of *Taphozous* from Kachh, *T. Kachhensis*, Dobson. As a full description of this species will shortly appear in Dr. Stoliczka's paper, to be published in the Journal (Pt. II, No. 3,

\* Cat. Mamm. Mus. As. Soc. Bengal, pp. 28, 29.

† I have thus named the pouch formed by a duplicature of the wing membrane passing from the under surface of the end of the forearm to the proximal end of the fifth metacarpal bone.

‡ This description is intended as prefatory to a more detailed account of the characters of the new species to be published hereafter.

p. 221) it will be sufficient for the purposes of this notice to remark that it is distinguished from *T. saccolaimus* and *T. longimanus* by the absence of the gular pouch, and from *T. Theobaldi* by the smaller ears, less developed radio-metacarpal pouch, and by the distribution of the fur.

The species of Asiatic *Taphozoi* are thus increased to five which may be arranged as follows:—

*A. With a gular sac.*

*a. Wings from the ankles. Inner side of the ear not margined with papules.*

1. *T. SACCOLAIMUS*, Temk.

Radio-metacarpal pouch absent.

2. *T. LONGIMANUS*, Hardwicke.

Radio-metacarpal pouch present.

*B. Without a gular sac.*

*b. Wings from the tibiae. Inner side of the ear margined with papules.*

3. *T. KACHUENSIS*, Dobson.

Radio-metacarpal pouch present.

4. *T. THEOBALDI*, Dobson.

Radio-metacarpal pouch well developed, ears larger than in any of the preceding species.

5. *T. MELANOPOGON*, Temminck.

Radio-metacarpal pouch present; chin and neck in males with a beard of long black hairs beneath.

By Temminck all the Asiatic species of the genus are represented without upper incisor teeth, and in the remaining species he describes them in the young only of *T. Senegalensis*. In Dr. J. E. Gray's "Synopsis of the genera of *Vespertilionidae* and *Noctilionidae*," (Ann. Mag. Nat. Hist. 1866, p. 92), the absence of the upper incisors is given as a special character of a group of three genera including *Taphozous*, and in all other systematic treatises on the *Chiroptera* the want of the upper incisors is mentioned as a distinguishing mark of the genus.\* It has, therefore, surprised me not a little to find adult specimens, in the Indian Museum, representing the five species described above (with the exception of *T. saccolaimus*), possessing upper incisors, one on each side near the canine tooth.

The incisors are very short and weak, in some not distinguishable without cutting down on them, in others their extreme points alone appear above the gum, and are seen with difficulty by the naked eye. In most of the specimens of *T. longimanus*, I could not discover any upper incisors, but in

\* Dr. W. Peters has noted the presence of small upper incisors in the young only of *T. perforatus* = *T. Senegalensis*? Reise nach Mossambique, p. 55.



an apparently adult male from the vicinity of Calcutta the incisors are about 0".05 inch long, and very slender. The length and weakness of the upper incisors in *T. longimanus* probably accounts for their absence in the greater number of specimens of this species, as they are more liable to injury than the short blunt incisors of the other species, which scarcely appear above the level of the gum.

I have had the opportunity of examining but a single spirit specimen of *T. saccolaimus* (the remaining specimens in the Indian Museum being dried skins), and in it could not discover any trace of upper incisors, but as this species is closely affined to *T. longimanus*, the incisors are probably similarly long and slender and fall out on the least injury.

In *T. Kachhensis*, the upper incisors are very short and not distinguishable without cutting down on them; in *T. Theobaldi*, very short and blunt, their extremities discerned with difficulty by the naked eye, in one specimen I found the left incisor absent. In every specimen of *T. melanopogon* examined, five males and five females, the upper incisors were found present, very short, but distinctly visible with the aid of a lens.

#### VIII.—NOTES ON SOME SPECIES OF CHIROPTERA COLLECTED BY W.

THEOBALD, ESQ., IN BARMA,—by G. E. DOBSON, B. A., M. B.

Mr. Theobald has presented to the Indian Museum a small but very interesting collection of bats, made by him in Barma, which I find to consist of eight species representing seven genera.

##### 1. *Cynonycteris amplexicaudatus*, Geoff.

A new locality for this species. Mr. W. T. Blanford sent me, in March, last, two specimens from North-western India. It has also been recorded from the Philippine Islands, Amboyna, and Timor; its geographical range is, therefore, very extended.

##### 2. *Macroglossus spelæus*, Dobson.

The collection contains male specimens of this species not previously examined. The males also possess the peculiar post-anal glands noticed in the female specimens from which the original description of the species was taken.\* In a large adult male, in which the testes have descended, one of these post-anal glands forms, on each side, the posterior boundary of the temporary scrotum which, in this situation only, is devoid of fur. In none of the specimens is there any trace of a claw on the index finger which equals the metacarpal bone of the second finger in length.

Length (of an adult male) head and body 4".5, tail 0".55; forearm 2".85; second finger 4".9; fourth finger 3".3; tibia 1".2.

\* Journ. As. Soc. Beng. xl, p. 261.

3. *Rhinolophus pusillus*, Temminck.

A not quite adult female specimen referable to this species. The second lower premolar is small and placed slightly outside the tooth-row. This character, which has been made use of to divide the species of the genus into sections, is probably not of much value. Two spirit specimens of this species in the same bottle in the Indian Museum, identical in external form and measurement, present this difference in their dentition, that in one the second lower premolar stands in the tooth-row, whilst in the other it is external to it.

Length (of a female specimen) head and body 1"·7; tail 0"·7; ear (anteriorly) 0"·6; forearm 1"·4; thumb 0"·2; second finger 2"·0; fourth finger 1"·8; tibia 0"·55.

4. *Phyllorhina larvata*, Horsfield.

All the specimens are dark slate colour, resembling some from the Kliási Hills in the Indian Museum. Others collected by Dr. Anderson at the same place, Promé, Barma, also in the Museum collection, are golden yellow with reddish brown tips to the hairs.

5. *Phyllorhina fulva*, Gray.

Several specimens of this widely distributed species. Of five females, four are of that intensely vivid golden fulvous hue described by Mr. Blyth,\* and one of a paler shade of the same colour; the males are white with brownish tips to the hairs. Of several specimens of the same species brought by Dr. Stoliczka from Kachh but one, a female, possessed this golden fulvous colour, and of the specimens in the Indian Museum those of a yellow colour are all females, the males are invariably white, with more or less of the ends of the hairs brownish or purplish-black. This seems to indicate that the females only are of this golden fulvous colour. Most female specimens, however, resemble the males in the colour of the fur, and those of a golden colour are comparatively rare.

Each of the five golden fulvous specimens collected by Mr. Theobald contained a single foetus, and of these the fur of the individual with the most mature foetus presented the deepest hue. Taking into consideration the fact that I have not found any black and white females with young, it appears very probable that this colour is confined to pregnant females, and corresponds to the breeding plumage of birds.†

This species appears to be identical with *Ph. bicolor*, Temminck, from Java. The measurements of *Ph. bicolor* given by Temminck, and later by Peters (Monatsber. Berlin Akad. 1871, p. 323) correspond almost exactly, with the exception of those of the ears, with those found by me in the great-

\* Journ. As. Soc. Beng. xiii, p. 492.

† For instance as in *Oriolus melanocephalus*, remarked by Blyth. See Darwin's 'Descent of Man,' Vol. II, pp. 178, 179.

er number of specimens of *Ph. fulva* in the Indian Museum. The small size of the ears in *Ph. bicolor* may be the result of imperfect preservation.

6. *Tuphozous longimanus*, Hardwicke.

A male specimen without any trace of upper incisors.

7. *Nycticejus luteus*, Blyth.

This species differs from *Nycticejus Temminckii*, Horsfield, in size only. Its forearm very constantly measures 2".2 inch. in length, as compared with 1".8 inch. in the latter species.

8. *Vesperugo (Pipistrellus) imbricatus*, Horsfield.

The representative of the *Pipistrelle* of Europe in the tropics, according to Temminck. It is certainly as common in India as the *Pipistrelle* is in Europe, and is never absent from any collection of bats. The species *Vespertilio abramus*, Temminck and *V. lobatus*, Gray, have been probably founded on young individuals of this species. *P. imbricatus* is, very probably, *Vespertilio Coromandelicus*, F. Cuvier, in the adult condition.

The President announced that in accordance with the resolution passed at the meeting in February last, there would be a recess for two months, and that the next meeting would be in November.

The receipt of the following communications was announced.

1. Postscript to the Monograph of *Clausilia*,—by Dr. F. Stoliczka.
2. List of the books contained in Chand,—by J. Beames, Esq., C. S.
3. The Rhapsodies of Gambhir Rái, the bard of Núrpur, (A. D., 1650),—by J. Beames, Esq., C. S.
4. On new Barmese plants, Part I,—by S. Kurz, Esq.
5. Notes on Barmese and Arakanese land-shells, with descriptions of new species,—by W. Theobald, Esq., and Dr. F. Stoliczka.

The meeting then adjourned.

*The Rhapsodies of Gambhir Rái, the Bard of Núrpur (A. D. 1650),*  
—by JOHN BEAMES, B. C. S., M. R. A. S., &c.

A short time ago I received, through the kindness of Mr. Blochmann, a small volume containing about 100 pages of old Hindí poetry, written in a rude and sometimes almost illegible hand with frequent erasures and omissions.\* All that was told me about it was, that it was supposed to be a metrical chronicle of the siege of Núrpur in the Panjáb by the forces of Sháh Jahán.

\* This unique MS. was kindly lent to the Asiatic Society by the Honorable E. C. Bayley, C. S. I., for the purpose of having a copy taken. THE EDITOR.

The book was for a day or two a complete puzzle to me. The rudeness of the writing, the uncertainty about the subject, and the archaic form of the language, seemed to combine to conceal the author's meaning. By degrees, however, much became plain, though there are still words and lines which I have not succeeded in interpreting.

The poem is not a chronicle or connected history. It is a series of chants, or as we may fairly call them "rhapsodies," using the word in its old Greek meaning of short panegyrics, or songs sung by the family bard at the court of the Rájput prince whom he served.

The bard in this instance calls himself GAMBHIR RÁI, though in one or two poems the names of other bards are introduced as Kalyán Rái, Manirám Kavi, and even Kavi Chand. The majority, however, are by Gambhir, and bear his name as usual at the beginning of the last line of each rhapsody in the old Indian fashion "Kahat Gambhir Rái, &c."

The poems are in praise of RA'JA' JAGAT SINGH, lord of Núrpur, Mau, and Pathán in the north-western corner of present Kángra District near the left bank of the Bias River. From his immense stores of knowledge on all that concerns the Mughul dynasty in India, Mr. Blochmann has courteously supplied me with information on the subject of this Rájá.

Jagat Singh, son of Búsúdev Singh, zamindár of Mau, and other places adjacent, was one of those gallant, hard-hitting old Rájput chieftains whom the Mughul emperors knew so well how to attract to their service. Jahángír, under whom he served in Bengal, gave him the title of Rájá with a mansab of 1000. He subsequently rose to a command of 3000. In the 8th year of Shah Jahán, he was appointed to Bangash, the hill country south-west of Peshawar, and subsequently to Kábul, and distinguished himself in the wars in Kandahár and on the Persian and Turkistán frontiers. In the 13th year, he and his son Rájrup Singh rebelled, and garrisoned their mountain fortresses of Mau, Tárágarh, Núrpur, and Pathán. Shah Jahán sent an immense army to attack them under the command of Sayyid Khán Jahán Bárha and Sa'id Khán Bahádur Zafarjang, supported by numerous Kháns and by contingents of Rájput and zamindári levies.

After a long series of battles and sieges in which in spite of their overwhelming numbers, the royal troops were more than once repulsed, Jagat Singh was at last conquered. The Emperor could not, however, afford to lose the services of so stout and warlike a vassal, and Jagat easily made his peace and was sent to Kandahár with Prince Dára Shikoh, where he again distinguished himself. He returned, and died at Peshawar in A. H. 1035, (A. D. 1646).\*

\* This brief account is condensed from Mr. Blochmann's notes and translation from the *Pádisháhnámah*, II., pp. 237ff. I reserve the full account, in order to publish it with the complete text of the poems hereafter.

The latter half of the poem relates to Mandhatá Singh, the son of Ráj-rúp and grandson of Jagat. Ráj-rúp himself is only briefly and cursorily mentioned. As the bard passes on to Mandhatá direct from Jagat, it would seem that Ráj-rúp's reign was not marked by any remarkable events.

The language of the poem is in the main Hindí, but it is full of Panjábí words and constructions, and in one or two places seems to be pure Panjábí. After a brief invocation of Ganesh, the remover of obstacles, the poet plunges at once *in medias res*—

उमड़्यो रे समुद्र ज्यों साह जहाँ दिक्कीपत ॥  
 कै लाख दल साज डेरा आन कर्यो रे ॥  
 सुंदर सुहवे रत जगत सुमेर भूप ॥  
 मउ के मदान बीच खंभ गाड़ ल्यो रे ॥  
 बाड़ें करि गांटी कोऊ दूर नें न दहत पावे ॥  
 बांभी पातसाही सनमुख सार भाँयो रे ॥  
 मानसन आन सभ बांधि बासुदेव सुत ॥  
 जाना बनजारा एक टांडा साद पर्यो रे ॥ १ ॥

Swelled like the sea Sháh Jahán, lord of Dillí,  
 Arraying an army of many lakhs, he came and pitched his tent.  
 Beautiful, fair-faced, is here Jagat king of Sumerú,  
 In the plain of Mau planting the pillar he fought.  
 Making hedges and entrenchments that no one might touch him from  
 afar,

Restraining the Pátsháh's forces, he swept with the steel.  
 The son of Búsúdev coming arraying all his honored ones,  
 Like a banjara having loaded his *tánḍa*, has alighted.

दिक्की is of course Delhi, in its old Hindí spelling.

The Muhammadan historian does not say that the Emperor himself was present at the siege, and from other parts of Gambhir's own poems, it would appear that he was not there, though in others he is said to have been present. We must therefore refer आन कर्यो रे not to the Pádisháh, but to the army. The grammatical construction is excessively loose throughout the poems. आन is in Hindí often an irregular indefinite participle from आना, to come, though it may also be from आनना, to bring. In Panjábí आए is more frequently used in the sense of "having come," which I have, therefore adopted here.

सुंदर may refer to Jagat Singh whose beauty is often mentioned in the poems, or it may be an allusion to Kabráí Sundar whom the Emperor sent to visit Jagat just before the rebellion. This Sundar is always alluded to by Gambhir as सुंदर कुकव, or Sundar, the bad poet. He himself is unvaryingly सुकव, the good poet.

मदान बीच is a regular Panjabicism. In that dialect, बिच is the regular sign of the locative instead of में. The constant mention of the Maū ká mai-

dán is explained by the fact that Jagat, although he fortified and garrisoned all his strongholds, did not himself stay in any one of them. He entrenched himself in the plain of Mau, at the foot of some hills covered with jungle, where he had a villa and met his enemies there. There is the regular old smack of Rájput daring and fool-hardiness in this, in fact throughout the whole affair, Jagat and his son seem to have been playing at rebellion; perhaps his easy successes over the Muhammadans of Kábul may have put into his head the idea that it would be rather good (Rájput) fun to have a brush with the Pádisháh and his forces. खंभ गाड, planting the pillar, the रण खंभ, or pillar of war, just as we plant a standard in the middle of a camp.

सभ Panjábí and Sindi for सब. The र of सर्व on disappearing aspirates the remaining consonant.

टांडा is the encampment of bullocks made by the banjarás. Several towns in India are named Tándá from this cause.

मानतन I have taken as a plural of मानित, honoured, noble. If divided into मान तन, it is difficult to make sense of the passage.

The second poem relates how Jagat pressed the Sháh's army rather hard. It is not easy to reconcile this with the fact that they were three to one of Jagat's forces, and that he was the besieged and not they. It need not be quoted whole, the following lines will suffice :

चाकस है चहँ बोर बोर रावो साह दल ॥  
 मारत है सभ भोर यह जीय जानी है ॥  
 चलत न बाट घाट रहे न उमराउ ठाठ ( डाढ). ॥  
 खाने बिन पानी बिन फौजें बिल्लानी है ॥  
 मुनके खबर पातसाह जी मंसा पर्यो है ॥

He is vigilant on all sides to hem in the Sháh's army,  
 They smite them at evening and at dawn, this they knew in their minds,  
 One goes not by road or ghát, the Umrao remained not staunch,  
 Without food, without water, the armies were distressed.  
 Hearing the news, doubt fell on the Pátsáh's mind.

If we followed the Muhammadan historian's account, it would be perfectly compatible with the text, so loose and vague is its style, to translate this passage quite the other way. Thus in the first line by making साहदल the nominative, we might render—

"The Sháh's army were vigilant on all sides to hem *him* in."

But this would not agree with the assertion that the 'Umrao' did not remain firm or staunch; nor with the anxiety of the Sháh, nor with the general scope of the book, which is entirely in glorification of Jagat Singh.

बेर रावो I take to be for Hindi बेड रहना, "to remain surrounding;" बेड, or बेढ, (Sanskrit वेष्टन), and रावा, for रहवा, the old infinitive in वो (वा), which is constantly used in these poems, as in most Rájput dialects, though it has not left any very distinct traces in classical Hindi.

Omitting one line which is not quite clear, we come to the lines

राजन के राजा महाराजा जू जगत सिंह ॥  
तेरी तरवार की भरी भेख है भवानी को ॥

King of kings, great king, lord Jagat Singh,

The fullness of thy sword is a disguise of Bhavani.

Also

अजों लग राउ रंक खेत में खपत जात ॥  
जते केते झड़े बड़े पुत तुरकानी को ॥  
जनमें ते मारे अजनमें सुकुच डारे ॥  
तू नहार्यो भेट पेट हार्यो मुगलानी को ॥

To this day Ráos and poor men in the field they lie rotting,

As many tall sons of the Turkáni as they left there.

The born they slew, the unborn they destroyed through fear;

On seeing thee approach, the wombs of the Mughul women fell.

This translation does not satisfy me, but it is very difficult to get closer than a paraphrase to a style so defiant of grammar. One method of dividing the first line is खेत में खपत जात "the (tent) pegs have fallen," but this is deficient inasmuch as it supplies no correlative to the "tall sons" of the next verse. पत जात is hardly in our author's style, though he may have, as I suspect also in other places, here used purposely an archaic phrase. A better rendering still would be "in the fields of rich and poor," the fields round Mau being naturally the property of Jagat Singh's Ráos, and of his poorer subjects, while the Turks cannot well be called Ráos. को is of course the old Hindi genitive, modern का. It will be observed that the employment of the three genitive participles is totally at variance with the practice of the modern language, where we should expect तुरकानी के पुत in the plural. The most wildly ungrammatical line, however, is the last. Literally it runs

Thou, hast looked, a meeting, the womb fell, &c.

The idea of the women miscarrying through fear, is the same as that in the Rámāyan of Tulsī Dās (Sundara Kānd), where Hanumān is leaving Lanka

चलत महा धुनि गरजेउ भारी ॥  
गर्भ अवेउ सुनि निश्चर नारी ॥

Going he roared with mighty sound

Hearing it, the wombs of the she-fiends melted.

In the line of Gambhir I take as will be seen नहार्यो for निहारा, but in this as in many other passages, there are several ways of translating, all of which may be equally well defended.

After several pages of vague descriptions of fighting in the traditional Hindi style, we come to the following strophe in praise of Jagat Singh's exploits.

बंगस बलख सारैकै कंधार लोनी पल सांभ ॥  
 बडो सन बंधी रिप डरत किरपान तें ॥  
 उजबङ्ग बांध डारै लखी के पठान भारै ॥  
 नारी नर न्यारै न्यारै तेज भारै भान तें ॥  
 राजा वासुदेव तनय कछत गंभीर राय ॥  
 तेरे बास कंपत हैं जिय जंतु पान तें ॥  
 जग में तूहि असर जगता प्रसिद्ध भूप ॥  
 बाजते निसान जीत आये खुरासान तें ॥ १० ॥

Having smitten Bangash and Balkh, in an instant he took Kandahár,  
 Founding a great era, the foe fears his sword.  
 He binds and destroys Uzbaks, he sweeps the Pathán of Lacchí,  
 Women and men scattered here and there, thy glory is greater than  
 the sun,

King, son of Vāsúdev, saith Gambhir Rái,  
 From fear of thee all living beings tremble for their lives.  
 In the world thou art immortal, Jagata, pre-eminent king.  
 Beating the kettle-drum, victorious, thou hast come from Khurásán.

I do not know what is meant by लखी के पठान, so I have left it as it stands. बडो सन बंधी is apparently synonymous with सक बंधी, शाके बंधी, &c. It is a common practice to say of kings and warriors that they found an era, to date from some brilliant exploit of theirs, just as the Saka era is supposed to date from the victory of Śalivāhana. पान, in l. 6, is probably for प्राण.

Then comes more indiscriminate fighting. At k. 23, there is a fine bold defiance of the Emperor.

जे तू साह जहां श्वपति उह परबत को भूप ॥  
 जे तू दिल्लीपत उह पत है पठान को ॥  
 जे तू सेना सार पत उह बी तरवार पत ॥  
 जे तू तुरकान पत उह पत है हिंदुआन को ॥  
 कह कब चंद तू तो पिरधीपत साह जहां ॥  
 उन बी जगमा पत है जहां को ॥  
 आगे मत जाद इती आलम के पातसाह ॥  
 डाड रे मुमान आन राख तुरकान को ॥ १४ ॥

If thou, Sháh Jahán, art emperor, he is king of the mountain:  
 If thou art lord of Delhi, he is lord of Pathán:  
 If thou art lord of army and steel, he also is lord of the sword:  
 If thou art lord of Turks, he is lord of Hindús.  
 Saith Kavi Chand, though thou art lord of earth (Prithipát), Sháh  
 Jahán,

There also Jagata is lord of the world.  
 Advance no futher hitherwards, Patsáh of the world,  
 Quit thy hesitation, come and protect thy Turks.



The above specimens will give a good idea of this rugged old bard's style and subject. The allusion to Chand in the fifth line is curious as shewing how well known the Homer of the Rájput's is and has always been. The style of all the mediæval barde seems to have been modelled on that of the Prithiráj Rasau. It is like the song of Deborah in Judges v, taken without the explanatory history of Judges iv, and about as intelligible. There is the same stern joy in fighting, the pitiless triumph, the countless passing allusions to events supposed to be well known to the audience.

#### LIBRARY.

The following additions have been made to the Library, since the meeting held in July last.

#### *Presentations.*

\*.\* Names of Donors in Capitals.

Bulletin de la Société de Géographie, April, 1872.—LA SOCIÉTÉ DE GÉOGRAPHIE, PARIS.

Journal of the Chemical Society, February, March, and April, 1872.—CHEMICAL SOCIETY OF LONDON.

Edinburgh Astronomical Observations, Vol. XIII, 1868-70, by C. P. Smyth, F. R. S., L. and E., F. R. A. S., F. R. S., S. A.—ROYAL OBSERVATORY, EDINBURGH.

The Nusr-i-Benazeer, or The Incomparable Prose of Meer Husan, literally translated into English, by Major H. Court.—THE AUTHOR.

The Aráish-i-Mahfil; or the Ornament of the Assembly, literally translated from the Oordoo, by Major H. Court.—THE AUTHOR.

Dengue, and its treatment, being the substance of a lecture delivered at a meeting of the National Society, held on 9th June, 1872, by Baboo Bhoobun Mohun Sircar.—THE AUTHOR.

Report on the Survey Operations which accompanied the advance of the Right Column, Lushai Expeditionary Force, 1871-72, by Major J. Macdonald.—THE AUTHOR.

Hand-Book of the Manufactures and Arts of the Panjáb, by B. H. Baden Powell, Esq., C. S.—THE AUTHOR.

Ocean Highways. The Geographical Record, Vol. II, No. 4, 1872, by C. R. Markham, C. B.—THE EDITOR.

Mookerjee's Magazine, Vol. I, No. 1, 1872, N. S., by Bábu Sambhu Chandra Mukhopádhya.—THE EDITOR.

Flora Sylvatica, Parts 22, 23.—THE GOVERNMENT OF INDIA, HOME DEPARTMENT.

The Revenue Resources of the Mughal Empire in India, from A. D. 1598 to A. D. 1707, by E. Thomas, Esq.—THE GOVERNMENT OF INDIA, HOME DEPARTMENT.

The Chronicles of the Pathan Kings of Delhi, E. Thomas, Esq.—THE GOVERNMENT OF INDIA, HOME DEPARTMENT.

Report of the Sanitary Commissioner for Bengal, for the year 1870-71, with Appendix, by D. B. Smith, Esq., M. D.—THE GOVERNMENT OF BENGAL.

Records of the Geological Survey of India, Vol. V, P. II, 1872.—THE GOVERNMENT OF BENGAL.

Memoirs of the Geological Survey of India, Vol. VIII, Pt. II.—THE SUPERINTENDENT OF THE GEOLOGICAL SURVEY OF INDIA.

*Exchange.*

Nature, Nos. 135—139, 1872.

*Purchase.*

Comptes Rendus, No. 18, 1872.—Revue des deux Mondes, 1st May, 1872.—Journal des Savants, April, 1872.—Revue Archeologique Nos. 2, 3, 1872.—Deutsches Wörterbuch von J. Grimm und W. Grimm. Vol. IV., Lief 5.—Conchologia Indica, Pt. IV, by S. Hanley and W. Theobald.—The Indian Annals of Medical Science, No. 29, 1872,—Calcutta Review, July, 1872.

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# PROCEEDINGS

## OF THE

# ASIATIC SOCIETY OF BENGAL,

## FOR NOVEMBER, 1872.

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The Monthly General Meeting of the Society was held on Wednesday, the 6th instant, at 9 p. m.

T. Oldham, Esq., LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

The following presentations were laid on the table—

1. From Bábú Rájendralála Mitra, three copper seals with inscriptions, received from Colonel Pearse, R. A.

Mr. Blochmann said—

The inscription on the middle-sized seal is clearly

محمد مرتضى

*Muhammad Murtazá.*

The diacritical marks are wanting.

That on the smallest looks like *ليكا* *liká*, but I am not quite sure. The largest has not been deciphered.

2. From A. C. Cadell, Esq., C. S., copies of two inscriptions from Sambhalherá, Muzaffarnagar, N. W. Provinces.

Mr. Blochmann made the following remarks :—

The inscriptions forwarded by Mr. Cadell are from a tomb and a mosque in Sambhalherá, one of the principal seats of the Barha Sayyids.\* This clan played a most important part under the Mughul Emperors; but before the reign of Akbar, little is known regarding them. They trace their descent from one Abul Farah, who is said to have come to India under Iltutmish (Altamsh). Mr. Cadell some time ago collected numerous genealogical tables of the several branches of the Sayyids, and he has now succeeded in discovering a valuable inscription, “which takes back the ascertained date of the

\* *Vide* Aín translation, p. 390, and Journal, A. S. Bengal, 1871, p. 260.

Sayyid settlement to a period as early as, if not earlier, than that of Fírúz Sháh."

I. *Inscription on a Tomb at Sambhalherá.*

لا اله الا الله محمد رسول الله

افتتاح بناء این روضه	در سوم از جماد الاولی بود
هفت صد هفت از پس هفتاد	رفت از هجرت رسول و دود
عهد فیروز شاه عالی بخت	عرش تخت و مظفر محمد
این حظیره منازل علوی	ابن سالار بن حسین فرمود
حق تعالی بفضل رحمت خود	برساناد در سرای خلود

*There is no God but God, Muhammad is the Prophet of God.*

1. *The beginning of the building of this tomb was on the 3rd Jumdila I.,*
2. *After 777 years had passed away since the flight of the beloved prophet [30th September, 1375, A. D.],*
3. *(During) the reign of Fírúzsháh, (the king) of high fortune, whose throne is the highest heaven, the victorious, the praiseworthy.*
4. *Ibn Sálár, son of Husain, ordered this tomb of heavenly grandeur (to be built).*
5. *May God Almighty in His kindness and mercy receive him in the eternal mansion!*

This Ibn Sálár, son of Husain, is mentioned in Mr. Cadell's tables of the Chatrauri clan as the eighth descendant from Abul Farah, and is styled 'Sálár Auliá,' 'Sálár the Saint.' It is noticeable that the inscription does not call them Sayyids, but the omission may be *ob metrum*.

II. *Inscription on a Mosque in Sambhalherá.*

لا اله الا الله محمد رسول الله • در عهد شاه جهان پادشاه غازی مسجد آراست سید  
ماکون ولد بهاؤالدین • معمار دسوندی • سنه ۱۰۴۱ هجرت

*There is no God but God, Muhammad is the Prophet of God. In the reign of Sháh-jahán, the Pádisháh victorious over infidels, Sayyid Mákhán, son of Baháuddín built this mosque. The Architect is Daswandí. 1041, A. H. [A. D. 1631-32].*

The Pádisháhnámah mentions, it would appear, two Sayyids of the name of Mákhán. One was the son of 'Abdullah, and was killed in the last battle with Khan Jalián Lodí (A. H. 1040; *vide* Pádisháhnámah, I, 351); the second was a commander of Nine Hundred, 500 horse, and is said (*loc. cit.*, I, b., 312) to have died in the ninth year of Sháhjahán, or A. H. 1045-46. The architect's name also occurs, according to Mr. Cadell, in the inscription of another mosque at Ghálíbpúr.

3. From E. T. Atkinson, Esq., C. S., three inscriptions from Kol, near 'Aligarh.

Mr. Blochmann remarked—

These inscriptions refer to the building of the fort of Kol in 931, A. H., or A. D. 1524-25, during the reign of Ibráhím Lodí, and to the building of

a dargáh for the saint Iláhbakhsh and a mosque by Sābit Khán, in A. H. 1129 and 1141, or A. D. 1717 and 1728.

The fort is now in ruins. Sābit's mosque stood in it.

None of the persons mentioned in the inscriptions occur in Muham-madan histories.

## I.

بسم الله الرحمن الرحيم

که پدید آورد حضرت مصطفی را	نخستین حمد گفتم مر خدا را
نهانم نامن بهاند / یادگارے	نہستم چند بیت از پی حصارے
که اتدانی شده در عهد شام	حصارے استوار و اصل محکم
که بخشد سایان را سیم وزر	که نامش است ابراهم سکندر
دبیری بد شهاب ابن منور	بشقداری محمد ابن عمر
باندک مدتی امام کرده	که در باب عمارت رنج برده
که حصنی یافته زبب کمالی	زهجرت بود نهصد سی و سالے
بیابد روز محشر سایه احمد	من بیچاره کو نام است احمد

In the name of God, the Merciful and the Clement !

1. At first I said, 'Praise be to God who has created Muṭṭasá (the Prophet).'
2. I then wrote several verses on account of the Fort. I shall not remain—a monument (of me) shall remain.
3. A strong fort, a firm foundation, completed in the reign of my king,
4. Whose name is Ibráhīm [son of] Sīkandar, who bestows silver and gold on beggars.
5. During the Shiqdārī (collectorship) of Muḥaʿimād, son of 'Ummar, when Shiháb, son of Munawwar, was Councillor.
6. He has suffered much hardship on account of the building, and raised the structure in a short time.
7. It was in 931 A. H. [A. D. 1524-25], when the fort was completed.
8. May I, a helpless man, whose name is Ahmād, find on the day of resurrection the shadow of Ahmād (the prophet).

## II.

این روضه برای آسودگی و آرامش حقایق و معارف آگاه شاه اله بخش بنده  
 خادم الفقراء ثابت خان عرف جعفر بیگ بن محمد بیگ بنا کرد در سنه یکهزار  
 و صد و بیست و نه هجری مطابق سنه ششم از جلوس محمد فرخ سیر پادشاه  
 فازی از بهاوسنگه معمار ترتیب یافت \*

This tomb was built for the rest and peace of Shāh Iláhbakhsh, (the saint) acquainted with hidden truths and revelations, by the slave, the servant of the faqirs, Sābit Khán, alias Ja'far Beg, son of Muḥammad Beg, in the year 1129 A. H. [A. D. 1717], the 6th year of the reign of Muḥammad Farrukhsiyar, Pādīshāh i Ghāzī, with the assistance of Bhāo Singh, the Architect.

## III.

الحمد لله حمدا متوافرا والشكر لله شكرا متواترا که بمصارف خزانه خیر محمدی  
 صلی الله علیه وسلم بنده درگاه خلایق پناه ثابت خان بهادر ثابتنجنگ بن محمد

بیگ قوم مغل ترکمان ساکن قصبہ کول مسجد جامع وچا در سنہ ۱۱۳۷ ہجری شروع  
احداث کردہ در سال یک ہزار و یک صد و چھل و یک ہجری موافق سنہ یازدہم  
جلوس محمد شاہ پادشاہ غازی الحجام تعمیر یافت \* از دست و زبان کہ بر آید  
کز عہدہ شکرش بدر آید ۱۱

The praise belongs to God; let us praise him without ceasing, and the thanks belong to God,—Let us thank him without end, that with sums for benevolent purposes for the sake of Muhammad—may God bless him!—the servant of the thrones of Him with whom all creatures take refuge, Sábít Khán Bahádúr Sábítjang, son of Muhammad Beg, a Turkmán Mughul, living in Kol, built the Jámí masjid in the well, commenced in 1137 A.H., and finished in 1141 A. H., or the 11th year of Muhammad Sháh, Pádisháhi Ghází [A. D. 1728]. Who can sufficiently perform the duty of thanking God? [Sa'dí's Galistán].

4. From Major F. W. Stubbs, some readings and rubbings of inscriptions from Miyán Mír, Maisúr swords, and Audh guns, &c.

Mr. Blochmann said—

Major Stubbs in sending the following inscription from Miyán Mír says: "Between Lahor and the cantonments of Miyán Mír are a number of tombs, very many so much dilapidated that they might be removed with advantage. Some, however, ought to be allowed to remain, and those with inscriptions ought not to be disturbed. One of the tombs, called the *Pák Díman*, contains besides the grave of the mother of Shaikh Imám-uddín, once ruler of Kashmír under the Sikh Darbár, the traditional remains of an adopted daughter of Husain ibn i Hazrat 'Alí, and a daughter of one Muhammad Muslim.

The first of Major Stubbs's inscriptions is taken from the tomb of the renowned saint Shaikh Muhammad Pír, *alias* Miyán Mír Bálapír, after whom the cantonment of Miyán Mír is called. He was born in Siwistán in 957, and went at the age of twenty-five to Láhor, where he had the reputation of a great ascetic. He died there on the 7th Rabí' I, 1045 [11th August, 1635]. His relation to Dará Shikoh was mentioned in Journal, A. S. Bengal, for 1870, p. 276. The tomb is north of the cantonment.

میان مومر دفتر عارفان	کہ خاک درش رشک اکسیر شد
سفر جانب شہر جاوید کرد	چو زین محنت آباد دلگیر شد
خرد بہر سال وصالش نہشت	بفر دوس والا میان میر شد
	سنہ ۱۰۴۵ ہجری

1. Miyán Mír, the first of the wise, the dust of whose door vies with the elixir of life,
2. Travelled to the city of eternity, when he was tired of this place of misery.
3. Thought wrote down the year of his death (as follows)—'Bafírlaus i wáldá Miyán Mír Shud,' Miyán Mír has gone to Paradise. A. H. 1045.

Inscription on a Sword (*talwár*).

ناد علیا مظہر العجائب	نجدہ عونا لك فى النوائب
كل هم وغم مینچلی	بنبرتك یا محمد بولایتك یا علی

يا علي يا علي يا علي  
شاه مردان شیر یزدان قوت پروردگار لا فتی الا علی لا سیف الا ذولفقار

The first three lines of this Arabic inscription are used all over the East as the most powerful amulet (*vide* A'in translation, p. 507). The last two lines are half Persian half Arabic. 'Ali is

*The king of men, the lion of God, the strength of the Almighty.  
No man is like 'Ali, no sword like his Zulfaqār.*

*Zulfaqār* is the name of 'Ali's sword. The sword would appear to be a *Maisūr* sword, because the last two lines of the inscription often occur in connection with Haidar 'Ali; *vide* *Hamlāt i Haidarī*, p. 505.

*Inscription on the chase of one of the trophy guns formerly belonging to the Bengal Artillery.*

زهی توپ سرکار نواب صفدر بر اعدای دین محمد مظفر  
بفضل احد چون ظفر یاب شد ازان گشت تاریخ او هم مظفر

1. *Well done, O gun belonging to Nawāb Ḥafḍār, victorious over the enemies of the religion of Muhammad.*

2. *As through the grace of the only God he was victorious, the date of the gun, too, is muzaffar, the 'victorious.'* [A.H. 1168, or A.D. 1754-55.]

The *tārīkh* is here what is called *تعمیه*, or hidden, because it is *muzaffar* minus (ازان) *ū ham*, or 1220—52, i. e., 1168 A. H., when Nawāb Ḥafḍār Jang was Vazīr of Audh.

Mr. Blochmann also said that the members would be glad to hear that General Cunningham had sent to the Society a very large collection of Sanskrit and Muhammadan inscriptions. They would be laid before the Society at the next meeting. Only one inscription he would now lay before the meeting, the inscription on the tomb-stone of Princess Jahānārā, of which General Cunningham had sent a beautiful facsimile.

Princess Jahānārā is the second daughter of Shāhjahān by Muntāz Mahall (the 'Tāj-bibi'), and was born on Wednesday, 21st Ḥafar, 1023 [23rd March, 1614]. She is called in Muhammadan histories Mustafāb Begum, or Begum Ḥāhib,\* and died at Dihlī on the 3rd Ramazān, 1092 [6th September, 1681, A. D.], in her sixty-eighth year. Like many of the imperial princesses she was not married. She disliked her younger brother Aurangzīb. Her numerous charities gained for her a good name.

Regarding her death, the *Maisir i 'Alangirī* says—"On the 7th Ramazān, His Majesty received a report that the angelic queen of the angels of the world of good and pious deeds, Jahānārā Bānū Begum had died at Dihlī on the 3rd. She was buried in the courtyard of the mausoleum of Shaikh Nizāmuddīn Auliā, where she had before built a tomb for herself. His

\* So also Bernier in the beginning of his work. He gives a long chapter of *on-dits* and court-scandal about her.



Majesty [Aurangzib] was much afflicted by the death of his elder sister, and ordered that the *naubat* (music at sunrise, &c.) should not be played at Court for three days."

The inscription is—

هو الحى القيوم  
بغير سبزه ندوشد كسى مزار مرا كه قبر پوش غريبان همين گياه بس است  
الفقيرة الفانية جهان آرا مريد خواجگان چشت بنت شاه جهان پادشاه غازي انار لله  
برهانه

سنه ۱۰۹۲

*He is the Living, the Lasting !*

*Let no one cover my lonely grave With gold or with silver brocade :*

*Sufficient for me is the cover of turf Which God for the poor has made.*

*The poor, the perishable, Jahánará, the disciple of the Chisht Saints,\* daughter of Sháhjahán Pádisháh i Ghází—May God enlighten his evidence ! A. H. 1092.*

The verse contains an allusion to the practice of the Muhammadans to cover the tombs of saints with costly clothes, or at least with a white sheet, as may still be seen in many *dargáhs*.

5. From the Government of India, Public Works Department, forwarding a copy of the correspondence regarding a fall of lightning on the Left European Infantry Lines at Morár.

The following letter from the Executive Engineer, Morár Division, Military Works to the Superintending Engineer, 3rd Circle, Military Works, was read.

Has the honor to report that No. 3 Barrack, L. E. I. Lines was struck by lightning on the night of the 27th Instant.

2. The lightning struck the north-east corner of the east portico at the end of the gable cornice, stripped a piece of plaster off, four inches wide and about eighteen inches long.

3. It then entered the building through a door below the cornice, striking a man on the arm, who was closing the door at the time the flash occurred. From the door it went to an arm-rack within the barrack, at a distance of about thirty-six feet, struck a bayonet, drilling a small hole through it, and apparently passing down the barrel split up the stock of the rifle.

4. No trace can be found of its disappearance, and the building is uninjured, except that one or two hooks for window-lines near the door are said to have been knocked out of the wall by it. The man was senseless, but has partially recovered, being still unable to use his limbs on the side he was struck.

\* To which also the renowned Mu'inuddín i Chishtí of Ajmír belongs. He was looked upon as the patron of the Imperial family.

6. From Captain M. M. Bowie, Deputy Commissioner, Sambhalpúr, a copper-plate grant consisting of three leaves, found in the Sambhalpúr District.

The President said that these plates had been found buried in an earthen vessel some depth below the surface in the Tributary State of Patna attached to the Sambhalpúr District. The following summary of the grant had been made by the Assistant Secretary, but a full translation would be prepared and brought before the Society again.

'Jánnejáya Deva, donor of several villages to several bráhmans of Gotáma, Sávarni, and Agasti Gotras and of the Sama Veda Kutumi and Yajur Veda Kanva branches, dated the 6th year of the Victory As'hád'h Sudi, 8th lunar day, bright fortnight.

The Raja is of the Lunar race.

The ancestors of the donors are Vijáya Krishna and Siva Gupta Deva, monarch of the three Kalingas.

7. From W. J. Elmslie, Esq., M. D., copy of a Vocabulary of the Kashmíri Language.

The following gentlemen duly proposed and seconded at the August meeting, were balloted for and elected Ordinary Members—

C. P. Gordon, Esq.

Lieutenant W. A. Holcombe, Mánbhúm.

Lieutenant W. S. S. Bisset, R. E.

E. H. Man, Esq., Port Blair.

The following are candidates for ballot at the next meeting—

E. O'Brien, Esq., C. S., Gurgáon, proposed by Carr Stephen, Esq., seconded by Captain J. Waterhouse.

C. P. Bird, Esq., C. S., Hisár, proposed by Carr Stephen, Esq., seconded by Captain J. Waterhouse.

D. C. J. Ibbetson, Esq., C. S., Kurnál, proposed by Carr Stephen, Esq., seconded by Captain J. Waterhouse.

Rev. A. F. R. Hoernle, D. Ph., Professor of Sanscrit, Jaynáráin's College, Benares, proposed by Bábú Rájendralála Mitra, seconded by H. Blochmann, Esq., M.A.

Captain E. Swetenham, Ex. Engr., Prome, proposed by E. W. Oates Esq., seconded by Dr. F. Stoliczka.

Rev. C. H. Chard, Officiating Chaplain, Thyetmyo, proposed by E. W. Oates, Esq., seconded by Dr. F. Stoliczka.

Major J. G. Forbes, R. E., Chief Engineer, Sardah Canal, proposed by A. M. Broadley, Esq., C. S., seconded by H. Blochmann, Esq., M.A.

Bábu Pránanátha Pandita, Bhawánipúr, proposed by H. Blochmann, Esq., M.A., seconded by Captain J. Waterhouse.

The following gentlemen have intimated their desire to withdraw from the Society—

Dr. S. M. Shircore. S. Lobb, Esq.

The following letters were read—

1. From the Curator, Indian Museum, forwarding for exhibition three silver seals found in an old chest belonging to the office of the Magistrate of Dháká.

One of these seals is the seal of the Company while it held the Diwání, and bears the following inscription—

۱۱۸۷ شاه عالم بادشاه غازي مدار المهام سپه سالار كمپني انگریز ودوي  
ديوان صوبه بنگالا مہر کمپني سنہ ۱۵ ضلع جہانگیر نگر سنہ ۱۷۷۰

The other is the seal of one of the Nawábs, and bears the following inscription—

مہر محالات شاہ بندر وغیرہ داخل حضور

The third seal is an old seal of the East India Company, and bears round a shield the inscription—

ENGL E IND COMP

DACCA.

2. From the Curator, Indian Museum, forwarding for exhibition a collection of hatchets, spears, musical instruments, &c., as used at the present day by the Baigás, a wild tribe of the Bálághát District. The following notes descriptive of the manners and customs of the Baigás accompanied the letter—

*Extract from Captain W. B. Thompson's Settlement Report of the Seoni District for 1867.*

\* \* \* \* \*

148. Under this denomination [Baigá] I class all the tribes whom I understand to have been in the country previous to the Deogarh rule, except the Gaulís. They consist of the Baigás, Gonds, Purdhans, Mehrahs, Bhureas. The Baigás are the wildest of these tribes, inhabiting the most inaccessible hills and the remotest forests, living on what they can secure with their bows and arrows, in the use of which they are very skilled, and on the forest-produce, or whatever they can get in exchange for it, and the small crops, which they raise on the hill sides, kodo, kutki, rehur. They are extraordinarily shy, so much so, that it is often difficult to get hold of them, unless you are accompanied by some one they know. They fly out at one end of the village as you appear at the other, and you can see them scrambling up the hill sides amongst the stones and bushes, or hiding and peeping from behind bushes at you, like wild animals. It is of no use

whatever to call to them, and equally hopeless trying to catch them. They are, as may be imagined from their habits, thoroughly acquainted with every path in the forest; it is difficult to get them to give information about game.

149. In their dealings they are proverbially honest, and indeed are quite unaccustomed to money dealings of even the most trifling nature. They generally barter what they collect, in the shape of forest produce, for salt. Colonel Dennys, in his Tribes Report, gives an interesting account of their origin and customs, showing them to be distinct from the Hindús. They certainly have nothing of the Hindú about them, except the reverence for the cow, and the worship of some of the same idols. They hardly seem to understand the use of water except for drinking, and are filthy in their persons. They never use the plough or till the land, but sow in the ashes of the jungle which they cut down. The places thus sown they call "bewurs."

\* \* \* \* \*

*Extract from letter No. 1532 A, dated 30th June, 1869, from the Deputy Commissioner, Bálághát, to the Commissioner, Nágpur Division.*

\* \* \* \* \*

81. The Baigás, of whom there are about 2,331 in the district, are to be found on many of the hill tops in the upper plateau. Their villages, composed of a neat square of about 20 to 10 or even 5 houses, are generally found in small depressions in the hill side, securely hidden from external gaze by the surrounding forest trees and jungle, and were it not for the fact that these wild people generally cut their dhya (called by them and the Gonds "chewers") on the summits of the highest peaks, and connect themselves with the outer world by narrow but well-beaten footpaths, it would be extremely difficult to find out the sites of their villages.

82. The dress of the Baigás of the wilder classes consists of merely a very scanty rag round their loins. This is what they wear when visited by Europeans, but I understand that a Baigá at home, without visitors, considers part of even this dress superfluous and adopts a more light and airy costume. On the other hand, those who are accustomed to visit and be visited by more civilized people, dress very well, and adopt jackets, turbans, dhotís, and other fashions from the plains.

83. The houses of the Baigás are so small that even the dhya-cutting Gonds, when asked about them, enlarge upon their diminutiveness, as compared with their own dwellings. From the ground to the ridge pole is generally about six feet, the breadth is about the same as the height, and the length may be one or two feet more. The only materials used in the construction of the houses are bamboo and earth. The frame-work of the building is made of whole bamboos, which are covered over with bamboos, wattle and dab. The villages are generally built in the form of a square

with one or two outlets, or as three sides of a square, all the houses in one row being joined together, and have a neat verandah in front, all the houses having their fronts towards the centre of the square. The neatness of a Baigá village which has been established above a year, is quite wonderful, and sets a good example to the larger and more civilized villages of the plains. Moreover, they seldom remain in one place more than three years, and when they are once deserted, nothing but a few pieces of charred bamboo and the surrounding clearings show where they once existed.

84. The shyness of the Baigás has been frequently mentioned in various reports, and many people who have had to deal with them have complained of the difficulties which they have experienced in meeting them, as no sooner have the intending visitors come within sight or hearing of one side of the village than the inhabitants have disappeared in the opposite direction amongst the rocks and jungles. Whether such is or is not now the case in the wildest parts of the country I do not know; but, so far as my brief experience goes in my visits to villages on the Bhainsíghát range and near the Tipagañ hill, I have always found the Baigás quite friendly; the men have come out into the middle of the squares to converse, and the women, so soon as they have seen that no mischief was intended, have clustered with their children in the verandahs of their houses.\*

3. From Edward Thomas, Esq., on the notice of the coin of Plato, lately purchased by the British Museum.

'The notice of the coin of Plato, lately purchased by the British Museum, which appeared in the Journal of the Asiatic Society of Bengal, for February last (p. 34), is imperfect, under its most important aspect, in consequence of the writer having apparently relied upon the cast forwarded to the Society instead of critically examining the original piece itself.

'The singular value of this coin consists in its bearing on its surface the full date of issue in the Seleucidan era, in which respect it is *unique* in the entire Bactrian series, and, moreover, the date itself furnishes a just tribute to the value of Numismatic science, inasmuch as it exactly accords with the epoch General Cunningham had already assigned as that of the decease of Eukratides and the accession of his successor, which the obverse of this specimen sufficiently declares Plato to have been (Prinsep's Essays, ii, 175).

'Although we were fully prepared to anticipate the natural use of the Seleucidan era by the Bactrian Greeks, its confirmatory appearance gives weight to the theory of its extension among the subordinate dynasties with whom the Greeks came in contact, and materially strengthens my own view of the propriety of the application of that system of reckoning to the dates

\* A full account of the Baigás will be found in the Central Provinces Gazetteer, p. 278. Ed.

on the Saurashtran coins, which places the Sah kings between the 2nd and 1st centuries B. C.\*

'The primary correction which is needed in the description of the coin is, that instead of "three somewhat indistinct letters, which are like MOΣ, we must substitute the letters P M Z, the numerals for 147; the M and the Z are clear and indubitable, and though the P is obscured by the oxyde of silver, which has largely affected the surface of the piece, I have fully satisfied myself as to its correctness, and my interpretation proves to be further confirmed by the record entered on the first incorporation of the coin in the British Museum collection, by the assistant in charge, who had no concern with the import of the date in question.

'The Seleucidan era commenced 1st September, 312, B. C.—which brings the date of this coin to 165, B. C.

'A minor alteration in the published description is requisite in the fact, that the leading figure on the reverse is not that of the king but of *Helios*, the sun god, whose rayed halo follows the outline of the well-known western representations of the divinity.

'It must be mentioned that the authenticity of the coin has not remained unquestioned, but I see no sufficient reason to shake our faith in its genuineness. The conception of the horses of the sun is in advance of their execution, but this merely implies that good models were still extant among failing artists. The letters which compose the legend are well-defined and carefully ranged, but they vary in form from the ordinary characters employed in the mints of Eukratides, and they equally differ from the outlines which are preserved in the associate mint monogram, but this latter divergence may be explained by supposing that the punches for the mints were kept ready prepared and struck into the soft steel of the die, whereas the legend of the new sovereign had to be cut expressly for the occasion.

'I have been the more particular in supplying these details, as I hear that the officials in charge of the medal room, with overstrained caution, refuse to allow casts of the coin to be supplied to the public, on the certainly invalid plea of fear of injury to the surface of the metal.'

4. From J. W. B. Martin, Esq., on the Archaeological remains of Barantpūr in Zila' Bhāgalpūr.

\* See Journal, Royal Asiatic Society, xii. (1850,) p. 41, note 3—Journal, As. Soc. Bengal, 1855, note, p. 565—Prinsep's Essays, ii, 86-7—Journal Asiatique, of Paris, 1863, p. 388.

See also, on the general subject, Lassen, Ind. Alt. ii, 794—T. St. Martin, Jour. des Sav., viii. (1859), p. 452—Dr. Bhau Daji, J. R. A. S., xx, 105.

J. A. S. B. (1863), p. 161—Bombay Branch R. A. S. 1862, and 1863, p. 231. Genl. Cunningham, J. A. S. Bengal, 1864, p. 35.

At the village of Barantpúr in Zila' Bhágalpúr there is being built at present a shrine, at which immense numbers of Hindús assemble during the Durgá pújá, to offer up kids, &c., to Chandí, the supposed goddess of the place. At this place, a long time ago, were found a few black stones, a carving of a woman rather larger than life, a figure of a warrior on what appears to be a tiger and is called by the natives Budhai (this figure is rather damaged), and a few stones such as were let in as threshold stones in grand native buildings of ancient date. On one of the latter is an inscription. Mr John Christian has kindly translated it for me, a copy of this translation I enclose. The characters are mixed and are, what they here call Debáchár and Mithiláchár. On my enquiring from the villagers if they knew anything of the antecedents of the place, I managed to get a little information which I add. In the old days, when the former shrine was in its glory, a Musalmán encampment was formed to the north of Barantpúr and the troops therein were under the command of a powerful general. This general, one day being excited by drink, determined to humble the pride of the goddess and disgrace the religion of the Hindús, and ordered his darwán to go and ask the hand of the goddess Maheshwarí in marriage. She guessing that their intention was merely to disgrace her by so mean a union, and knowing that her people were unable to cope in war with the Mughuls, pretended to consent to the union, but proposed certain conditions which were, that the Mughuls should in one night before the cock crew, make a fort of certain dimensions and a hundred tanks in its vicinity, and should offer a black kid at her shrine. The fort was made, ninety-nine tanks were dug, and the hundredth tank was nearly completed, the kid was being led towards the shrine, in order to be ready to be offered on the completion of the hundredth tank, when the goddess transforming herself into a cock, crew. The conditions not having been completed, the marriage was not performed. The Mughals, however, frightened at her power, fled\* from this portion of the country. The fort alluded to I have seen, as also the tanks; the fort is situated near the village of Úti. The tanks, although I have not counted ninety-nine, exist in great numbers, but appear to have been dug merely to obtain earth for making the earthwork of the fort which extends over about one square mile of ground. About the centre of the oblong-shaped site is a spot very much higher than any other portion of the fort. There are no legends which explain when or why this shrine was neglected as a place of worship, but it is quite clear that for a long time such was the case; for comparatively lately the stones I have described were dug up, and a Goála built a shed over them, and from this time all castes of natives have continued to worship

\* The name of this general is said to have been 'Alí Khán, and his speedy retreat has given rise to a proverb used in this part of the country. If a person is unsuccessful in an undertaking, people say, "*Wah, 'Alí Khán kí karní hai.*"

Maheshwarī there, under the name of Chāndī. From the first Goāla family which looked after this shrine, sixteen hundred families now exist in the villages adjacent to Barantpūr. These Goālas are called Debahār, the exact meaning of which is not known, but it is only a man of this class who can attend to the duties of this shrine. This class of Goāla did not exist till the stones were discovered, nor do they exist, as far as I know, in any other part of India. I should here tell you that the goddess or figure of the woman is only half visible, the natives being afraid to unearth it. To the south-west of the place where the goddess stands, is an immensely deep perfectly round tank, from which rumour says, all the water used for the shrine was taken. The whole of the land round is high, but the natives decline to allow it to be dug.

Inscription on a granito door-frame found in Barantpūr, March, 1872.

ঐশ্বৰ্য্যহেখরী বরলক্ষ সমস্ত সংক্রিয়া বিরাজমান বুদ্ধেশ বংশায় সনাচন্দ্ররাজ  
ঐশ্বৰ্য্যসিংহদেব বিজয়ী ।

‘The conquering Sarba Singha Deba, who is adorned with all good qualities, the blessed of Maheshwarī, the joy-bestowing moon of the lotus lineage of Būdhesa.’

The following papers were read—

1. *On the term Gaurian as a name for the Sanskrit Vernaculars of North India.*—By A. F. R. HOERNLE, D. Ph., Professor of Sanscrit, Jaynarain College, Benares.

At the June meeting of the Asiatic Society, exception was taken by several members to the term *Gaurian*. It was not from any literary curiosity that I proposed that term, but from the feeling of a pressing practical want. One who writes on subjects connected with the comparative philology of the North Indian Sanskrit Vernaculars, and has to refer to them collectively in a great variety of connections, ordinarily feels more than others the want of a short specific and comprehensive term to distinguish them; a term as short as Sanskrit, which denotes one specific language, or as *Prākṛit* which denotes one specified group of languages or dialects.

Now the two terms, Sanskritic and Indo-Aryan, which have been recommended in the place of *Gaurian*, are altogether unsuited for this practical purpose. If we speak of a rule of *Prākṛit* grammar, every one knows exactly what group of languages or dialects is referred to; but if we should speak of a rule of Sanskritic Grammar, who would have any idea of the language referred to in the phrase? It is hardly possible to conceive a more general term than Sanskritic. It may denote any language which stands in any sort of connection with Sanskrit; any language, in fact, within the whole range of the Indo-European family. It is plain that something would have to be added to that term to make it at all intelligible. But even the phrase “Sanskritic Languages of North India,” would not be



sufficiently determinate; for it would apply to the Prākritic dialects with as much propriety as to what I call the Gaurian languages. We should have to expand the phrase to "the Modern Sanskritic languages of North-India," before we possessed a perfectly definite term. It is not difficult to see how very inconvenient such a long-winded phrase is. It is far too unwieldy to be of any practical use.

The same objections lie against the term Indo-Aryan. It is too general; for it includes the Prākrit and Sanskrit languages. By all European comparative philologists it is used in this generic sense; to them the term would be misleading; it would never suggest the North Indian Vernaculars *only*. For this purpose it would be necessary to add the word "modern" and speak of "modern Indo-Aryan languages." But this again would be a term far too unwieldy to be practically useful. What is wanted is a name which should consist of *one* word only, which can be used by itself both substantively or adjectively, and which at the same time should be, on the one hand, sufficiently comprehensive to include all the North Indian Sanskritic Vernaculars, and on the other, sufficiently specific to exclude all other languages than these.

Now it appears to me that the term Gaurian answers these requirements sufficiently *for all practical purposes*. It is one word only, and can be used both substantively and adjectively. We may speak of a Gaurian Grammar and a Gaurian rule, as we speak of Prākrit Grammar and Prākrit rule. We may also use Gaurian as a substantive, and say that "Gaurian possesses such and such a rule," as we speak of Prākrit possessing such and such a rule.

Again, the term Gaurian is sufficiently specific. In North India two altogether distinct classes of languages are spoken, the one Sanskritic, the other non-Sanskritic. The latter are the languages of the Kols, Santāls, and other aboriginal tribes. But no one could possibly make the mistake of imagining that the term Gaurian might signify these non-Sanskritic languages. The term is too intensely Brāhmanical and therefore Aryan, to be connected in any one's thoughts with anything which is not in some way connected with the Sanskrit language. Gaurian, therefore, could only mean the Sanskritic languages of North India. But here again no one could easily fall into the mistake of supposing that Gaurian might comprehend the ancient Sanskrit and Prākrit, as well as the modern Vernaculars; just as no one is likely to imagine that the Romance languages include Latin. The term Gaurian is too narrow and modern for that; and there is already the good term Indo-Aryan to denote collectively Sanskrit and Prākrit and their modern offshoots. It follows then that the term Gaurian cannot signify anything but the modern Sanskritic languages of North India.

Another objection might still be thought to remain. It may be said that although the term Gaurian cannot include more than the modern

Sanskritic languages of North India, it does not necessarily include all of them; that in short, it is not sufficiently *comprehensive*. For the word *Gaurian* or *Gauda*, as used by Sanskrit writers, does not include the *Marāṭhās* and *Gujarātīs* who are classed as *Dráviḍians*, but whose languages belong to the North Indian Sanskritic Vernaculars. My answer is again, that the term *Gaurian* was chosen purely for a practical purpose; and if I can show, that it is sufficiently comprehensive for a present practical purpose, an objection taken from the manner of its use by Sanskrit writers is irrelevant. Now whether the use of the term *Dráviḍian* to denote the non-Sanskritic languages of South India be correct or not, (and I agree with *Bábú Rājendrakāla Mitra*, that it is open to objections), it is certainly now established as the technical term to denote those languages. The introduction of a new term even when more accurate to supersede a less accurate but established one, is always of doubtful expediency. The older and favourite term is rarely displaced, and generally the only result is, the use of two terms instead of one accompanied by endless confusion and requiring constant explanation. Since then, *Dráviḍian* is the established name for the non-Sanskritic languages of South India, and it would be unwise to make a change, due weight should be given to the fact in choosing a collective name for the Sanskritic languages of North India; it should be a name which has some reference to the other name, *Dráviḍian*, of the non-Sanskritic languages of South India. Here *Gaurian* most naturally suggests itself. For it expresses the exact contrary to *Dráviḍian*. In Sanskrit literature, these terms express an opposite relation. Hence as *Dráviḍian* is the established name for the non-Sanskritic languages of South India the term *Gaurian* as its opposite, will suggest to scholars Sanskritic languages of North India. And as all scholars know that *Marāṭhī* and *Gujarātī* are, equally with *Hindī*, and *Bengālī*, Sanskritic languages of North India, the term *Gaurian* will naturally comprehend in their mind all those languages. This, it seems to me, will be practically the certain result; and as I said before, that is all that we need consider in the present case. I do not think there is any fear, that in this case, scholars will be likely to take the term *Gaurian* in that limited sense, in which it is used in Sanskrit literature; for they will naturally associate it with its opposite *Dráviḍian*, and the term *Dráviḍian*, as is well known, is not in the connexion (*viz.*, as a name of a group of languages) understood in the limited sense in which it is used by Sanskrit writers.

I venture to think, therefore, that the term *Gaurian* will not be, as *Bábú Rājendrakāla Mitra* says, either unmeaning or misleading, but, on the contrary, will be exactly significant of that which I wish to express by it. I do not claim, however, to be the author of this particular application of the term, nor do I put so much store by it, as to be unwilling to abandon it in favour of another, and better, if really a better one; that is, if it be not only

free from the defects of the term *Gaurian*, but also possess all its advantages. The terms Sanskritic and Indo-Aryan certainly do not possess those advantages; for to render them at all accurate, the word "vernacular," at the very least, must be added. But this is the very word which in praxis would have to be omitted. For it would be too tedious and inconvenient, always to speak of a grammar, a rule, a law, etc., of the Sanskritic vernaculars; while on the other hand to say merely "Sanskritic grammar, or rule, or law, etc.," would be inaccurate and misleading, because omitting the only word (*i. e.* Vernacular) which gives to the term the necessary limitation and accuracy. With *Gaurian* it is different; it carries this limitation in itself.

There is, no doubt, considerable difficulty in finding a collective name for the modern Sanskritic languages of North India, which shall be open to no objection in any direction. The proposal of such terms, as *Cis-Vindhyan*, and others, sufficiently shows this. It may be wise then, under the circumstances, to agree to employ the term *Gaurian*, which has many peculiar advantages, and is sufficiently determinate for all practical purposes; and which, as I may repeat, I have been neither the first nor the only one to use,\* to denote the modern Sanskritic languages of North India.

Bábú Rajendralála Mitra said,—

"As the paper just read has been written with special reference to certain remarks made by me on the author's "Essay on the *Gaurian Languages*" submitted at the June meeting of the Society, I feel myself called upon to say a few words on the subject. The author, I am sorry, has missed the point of my argument. What I insisted upon then, and now contend for, is that we have no right to use well-known ancient or mediæval Indian terms in a new sense, and wish the public to believe that we are using well-known and well-established ancient or mediæval terms. It may be all very well for spiritualists to say that spirit means matter, because John Davis, or Judge Edmonds, or some other elder of their body, has, in one of his ecstatic moments, found it to be so; but in sober science, it is quite inadmissible; and no reference to authorities can justify that which is essentially wrong. The evil of such a course may be easily illustrated. I know not who it was that first named a class of animals amphibious, but we now know, that the animals so designated cannot live in water, and die on land, and naturalists have, therefore, been obliged to drop the use of the word altogether. We know also that a chemist named an article *narcotine*, probably on the *lucus a non lucendo* principle, for it has no narcotic property whatever, and somebody has lately been obliged to re-name it *anarcotine*. Other examples I could give the meeting by hundreds, but they are not wanted. The gentlemen whom I have now the honor to address, know full well the enormous extent of the injury which has been done to science by wrong

\* See Caldwell, *Comp. Gram. of the Dravidian*, p. 27.

terminology, and it is high time that a stop should be put to further misuse of terms. Now *Gauḍa* is an Indian word with two fixed meanings, indicating, in one sense, a distinct province with a well-defined boundary, and in another generically five provinces; and in the derivative form *Gauḍiya* implies men, animals, languages, and things belonging to that province, or those provinces. How on earth and on what principle of logic, or analogy, we are to make it comprehend provinces and languages far away from those places, I cannot understand. If Europeans have to use Indian terms, they should use them in the sense in which we use them, and not attach new meanings to old terms, and call them old. That would amount to a sort of literary imposition which, as an Indian, I must confess, I cannot tolerate. It may be that long-continued usage and general currency might give a new meaning to an old term, but this cannot be said of *Gaurian*, for it was used for the first time by Caldwell some twenty years ago, when it fell still-born from the press, and Mr. Hoernle's is the first attempt to revive it.

"As to its being good enough for all practical purposes, I look upon the plea as an apology for idle impatience. The term is wanted for the scientific treatment of certain dialects, and not for popular lectures; and even for popular purposes correct and fully expressive terms are preferable to incorrect, or inexpressive, ones. That name which is radically and essentially incapable of conveying the idea we wish to express, cannot be good either for science, or for practical purposes, and I cannot but deprecate its use, particularly as I believe there is no difficulty whatever in coining new and fully expressive names when they are needed.

"In forming new terms, two things have to be borne in mind, whether they are to be connotative, or non-connotative. For specific or absolute names we care not whether the word radically indicates the object to which it is applied or not. We talk of *mango*, and know well what fruit it is, but never bother ourselves, whether it is formed of *man* and *go*, or any other combination of the letters of its name. Mr. Long may be the veriest representative of General Tom Thumb, still he is Mr. Long, and Mr. White may be a shade darker than ebony, still he is White. The words, in such cases are, what the grammarians call, crude, or secondary crude, and as such, no notice is taken of their radicals, or original meanings. But the case becomes different when we have to coin terms which are to connote ideas, not by long association, or the fiat of the namer, but by the inherent power of their radicals, or in other words to serve as nominal definitions; and in such cases we must be very careful that we do not use words which fail to convey our ideas to the full extent, or convey more than we desire, or, as the Indian logicians express it, are faulty on account of incomprehensiveness (*avyīpti*) or super-comprehensiveness (*ativyīpti*). Dr. Hoernle admits that *Gauḍiya* was never

designed to indicate the Nepālī, the Kashmīrī, the Punjābī or the Sindhi, and he will not question that the vernacular of the Chilās mountain and of the Shīah Posh Kaffirs of Hindu Kush are Sanskritic vernaculars. If so, *ipso facto* his term is faulty from being incomprehensive. It is a mediæval Indian word with a fixed meaning, and he, as a foreigner, has no right to make it mean more than what it does, so as to include all the languages he wishes to treat of, unless he chooses to call it a word of his own, and not a Sanskrit term, for it has no inherent power of its own to expand and comprehend more than what it has hitherto comprehended. Had the word *Drāviḍa* been the generic name of countries inhabited by the Tamilian or aboriginal races, and *Gauḍa* been its correlative to indicate countries occupied by the Aryan races, the case would have been different; but as the terms never had such meanings, derivatives from them must remain as confined as the originals.

"I object to the term *Gaurian* the more because it is not by any means even equal in precision to the words which are now in common use. Dr. Hoernle says, *Gaurian* is a compact word complete in itself. But so is Sanskritic or Indo-Aryan. *Gaurian* is an adjective, and must be followed by a noun; so is Sanskritic; and if we put vernacular after it, it can only indicate those current spoken dialects of India whose prevailing grammatical and morphological characters are of Sanskrit origin, and no other. Joined to language or dialect, it would still imply them as also the different *Prākṛits*. Dr. Hoernle says, "It may denote any language which stands in any sort of connexion with Sanskrit; any language in fact within the whole range of the Indo-European glottic family." But how it is to do so I cannot imagine. I have been always under the impression that the leading European languages were sisters of the Sanskrit, born of one common parent, the Aryan, and not the descendants of Sanskrit, and therefore could not be called Sanskritic. Indeed, I am not a little surprised that a professed philologist of Dr. Hoernle's standing should so confound the parent Aryan of the plateau of Central Asia with her descendant, the Indian Sanskrit, as to take them to be the same, and make the latter the parent of the European languages against the concurrent testimony of the leading professors of the modern science of language. No one I imagine will ever call the English, or the Portuguese, a Sanskritic language, and therefore the apprehension Dr. Hoernle entertains of people being misled, is all but an impossible contingency.

"Nor are the examples he has given of the cumbrous nature of the compounds which the use of the word Sanskritic would lead to at all to the point. "Sanskritic languages of North India," and "the modern Sanskritic languages of North India" which he has put forth, appear very like giants created with a view to destroy them, for they are incorrect on their very face, and I have not advocated their use. He thinks "*Gaurian* languages" very

handy, but is the phrase Sanskritio Vernaculars, which his predecessors including Max Muller, the greatest philologist of the day, have used, less so? The same remark applies to the long-winded phrases he has given with reference the term Indo-Aryan.

“As to his idea of the impossibility of the Gauṛian comprehending both the ancient Prakṛits and the modern vernaculars, he will find that Mārkaṇḍeya in his *Prākṛita Sārvaśva* includes Gauḍa in his list of languages and dialects which come under the head of Prakṛit. Doubtless, Dr. Hoernle adds that “an objection taken from the manner of its (*Gauḍiyā's*) use by Sanskrit writers is irrelevant.” But I must confess my extreme reluctance to submit to this line of reasoning, as I feel pretty certain that were I, a foreigner, to say that man in English must indicate dormice, or some such animals, as well as human beings, and that “an objection taken from the manner of its use by English writers is irrelevant,” very scant credit will be given me, and that most justly, for the relevancy of my argument. I may add also that European scholars do make mistakes, as is but natural, when they are misled by inaccurate terms, and the Drāviḍian of Caldwell misled no less an oriental scholar than Dr. John Muir, who, seeing a reference to the Drāviḍian form of the Prakṛit in one of my essays, mistook it for a Tamilian language. Had Caldwell used the generally current and well-understood term Tamilian, instead of Drāviḍian in a sense of his own, this mistake would never have occurred. In short, I must say that it is infinitely better, when talking of current languages derived from the Sanskrit, to call them Sanskritio vernaculars which will come home to all and every body, than to beat about the bush, and use an ambiguous and uncertain word like Gauṛian which has one signification in Sanskrit and another in Dr. Hoernle's essay.”

2.—*On the Tirthas of Brindāban and Gokul.*—By F. S. GROWSE, M. A.  
B. C. S.

(Abstract.)

Mr. Growse describes in this paper the antiquities of Brindāban and Gokul. The oldest architectural remains of the former town refer to Akbar's reign, and it seems that, though now so well known as a place of pilgrimage, it only acquired its fame of sanctity in comparatively modern times. Mr. Growse also discusses General Cunningham's identification of *Klisoboras*, the *Carisobora* of Pliny, with Brindāban ('Ancient Geography,' p. 375), and shews that the name cannot refer to it.

The paper forms a continuation to Mr. Growse's Essay on the 'Country of Braj,' and has been referred to the Committee of papers for orders to print it in the Journal.

3.—*On a Picnic in Ancient India*—By BA'BU RA'JENDRALA'LA MITRA.

This paper has been referred to the Committee for orders to publish it in the Journal.

The reading of the following papers was postponed.

1. *Remarks on Winds, Typhoons &c. on the South Coast of Japan*—By COMMANDER H. C. ST. JOHN. *H. M. S. Sylvia.*

2. *Notes on some new species of Rhinolphidæ*—By G. E. DOBSON, Esq. M. B.

3. *Ornithological Notes*—By W. E. BROOKS, Esq. *C. E.*

*Extract from a Memoir by Professor Holmbøe entitled "Flaghoagen par Ravimoir og ne buddhistick Topes i Asien."*—*On the tumulus called Flaghoug or the mount of Pariblonde on the isle of Raven, and on the topes of Asia. By Professor Holmbøe of Christiania.*

Among the traces to be seen on the tumuli of Pagan Norway of Oriental origin, are the cylindrical forms of the bases of some of them. As the topes of Asia are ordinarily conical masses, resting on cylindrical bases, so are there a number of tumuli in Norway having similar bases, and among these, there are some whose bases resemble exactly those of some of the topes of India and Afghánistán. Thus the basement of Flaghoug on the Isle of Raven, near the south-west coast of Norway, is compared to the tope of Mankiyála, and to two topes of Afghánistán.

The author is of opinion that the compartments in the form of niches, which are to be seen on these bases, contained formerly idols such as the images of Buddha to be seen in Indian topes. In support of this opinion, he cites from Colonel Yule's travels, some topes in Ava, on which are to this day found images of Buddha placed in niches around the base of the monuments.

In Norway, where the art of sculpture was very little advanced during the Pagan times, one may suppose the images of Linga had been placed in the niches; for the author in his *Mémoire* on the traces of Sivaism, some years ago, demonstrated that the worship of the Linga had spread to Norway as to other parts of Europe.

*Extract from a Memoir by M. Holmbøe entitled "Om Novem i Norske Gravhoie."*—*On the bark in the tumuli of Norway.*

It is a well-known quality of the birch bark, that it resists decay for centuries; hence it is that it has been made use of in the cells of many sepulchral mounds, as an envelope for more precious things. The same bark

may be seen on the flags of stone which cover the cells. In this case the archæologists have supposed that it was put with a view to prevent water from penetrating into the cells. To demonstrate the inexactitude of this opinion, Mons. Holmböe cites examples of sepulchral cells which have been covered with only one large flag, over which a coating of bark could not contribute much to prevent the entrance of water. Consequently he thinks that the use of the bark must have had another object. The author thinks that the bark is used to bear inscriptions, and in support of this conjecture, he notices that several thin flags of stone have been found over the bark, probably to secure it against injury from damp. As an ulterior argument, he cites several topes of Afghanistan, in which Mr. Masson found, over the upper flags of the cellules a vegetable matter which he names *túz* or leaves, and which Professor Wilson takes to be "the inner bark of the *dhurj* or birch tree, which was very commonly used for writing upon by the Hindús in early times." In support of this conjecture, the author also cites the custom of the ancient Buddhists, to inscribe on sepulchral urns the names of the persons whose relics were deposited in them.

*Extract from a Memoir by Professor C. Holmböe entitled, "Eet Guldbract-eat Prog, som ofte forekommer."—A kind of bract of gold which is often met with.*

A great number—upwards of 200—gold bracts are preserved in the Museums of Copenhagen, Stockholm, and Christiania, which had been from time to time dug out of the earth—a few being obtained from sepulchral urns under the cinders of the dead. The most common type of these, presents a large human head on the back of a badly drawn quadrangle. Archæologists—predecessors of the author—thought that the type represents Odin, the chief of *torla* (sic), one of the northern divinities, mounted on his horse Sleepner. This opinion has been combated by Mons. Holmböe, in a memoir printed in the Bulletin of the Society of Sciences of Christiania, for 1858. M. H. has proved in it, that the quadruped ordinarily represented, has horns and therefore cannot be a horse. It has been said that these horns are intended for ears, but several specimens show the horns beside ears. As another argument against the received opinion, it may be observed that Sleepner, according to the legends, had eight feet, whereas the quadruped on the bracts never has more than four. Consequently M. H. started the opinion that the type is a poor imitation of the Buddhist coin, representing Siva mounted on the back of his bull Nandi. But one circumstance which he omitted to notice in his memoir of 1858, has led to his writing again on the subject, and it is this, that the animal everywhere appears carrying a tail in the form of that of a horse, which has contributed much to strengthen the previous opinion. The author now draws attention to the Tibetan bull named Yak, the tail of



which resembles that of a horse, and has placed in juxta-position drawings of the yak tail and three of the bracts under notice, which bear animals with similar tails.

But, it may be asked, what connexion can there exist between Scandinavia and Tibet? We reply that the Scandinavians, like other inhabitants of Europe, came from Central Asia. In pre-historic times it was not difficult for the Scandinavians to have been acquainted with the yak, when they were probably on the mountains where the *Ixana* and *Jaxartes* have their sources. To obviate any objection that may arise from the circumstance of the two countries being at such a great distance from each other, the author has an ulterior argument to the effect that among the idols of Tibet now current, there is one which bears a strong resemblance to the figure on the bracts. This is represented on plate No. 253, of M. Selagintweit's *Buddhism in Tibet*. It is a horse named *Langtu*, carrying on its back a figure named *Norbon*, which evidently is a degenerate representation of the head of *Siva*, as M. H. proves by placing on a plate the horse *Langtu* alongside of a drawing of *Siva* reproduced from Pallas' work on the Mongols and Kalmuks. Each of these heads have three eyes and the top of the hair divided, or perhaps in flames. The heads resemble each other as closely as a rude carving on wood can resemble an engraving on copper. The three eyes, so prominent on *Norbon*, are the parts most revered, and they are what the Kalmuks place on the back of the horse, the three eyes surmounted by a representation of the flaming hair of *Siva*, and this horse is an ornament on their altars, as shown on one of M. H.'s plates.

There is also another analogy between the ritual customs of the Tibetans and the Scandinavians. These are the constructions called *manis* or votive altars, formed of two similar walls placed at a short distance from each other, the space enclosed between which is filled up with gravel and earth, and which have the form of a roof, thus



The shape, the height, the width and the materials are the same in Norway and Tibet, but the length varies much here and there.

## LIBRARY.

The following additions have been made to the Library, since the meeting held in August last.

*Presentations.*

\*.\* Names of Donors in Capitals.

Bulletin de la Société de Géographie, May, June, 1872.—*LA SOCIÉTÉ DE GÉOGRAPHIE, PARIS.*

Bulletin de la Société D'Anthropologie de Paris, Tome VI, (II, Série) 2d, 3rd Fasciculi.—*LA SOCIÉTÉ D'ANTHROPOLOGIE, PARIS.*

Bulletin de l'Académie Impériale des Sciences de St. Petersburg.—Tome XVII Nos. 1 to 3.—*IMPERIAL ACADEMY OF SCIENCE OF ST. PETERSBOURG.*

Bulletin de la Société Impériale des Naturalistes de Moscou, Nos. 3 et 4 1871.—*IMPERIAL SOCIETY OF NATURALISTS OF MOSCOW.*

Mémoires de l'Académie Impériale des Sciences de St. Petersburg VI, série. Tome XVII, Nos. 11 12, XVIII, Nos. 1 to 7.—*IMPERIAL ACADEMY OF SCIENCE OF ST. PETERSBOURG.*

Mémoires de la Société Royale des Antiquaires du Nord. Nouvelle Série 1870-71.—*LA SOCIÉTÉ ROYALE DES ANTIQUAIRES DU NORD. COPENHAGUE.*

Transactions of the Zoological Society of London, Vols. VII, p. 7, 8, Vol. VIII, p. 1.—*ZOOLOGICAL SOCIETY OF LONDON.*

Proceedings of the Zoological Society of London, Pt. II, and III, 1871.—*ZOOLOGICAL SOCIETY OF LONDON.*

Transactions of the Linnéan Society of London, Vol. XXVII, Pt. IV, XXVIII, Pt. I, and II, XXIX, Pt. I.—*LINNEAN SOCIETY OF LONDON.*

Journal of the Linnéan Society of London, Botany, Vol. XIII, Nos. 66, 67, Zoology, Vol. XI, Nos. 53, 54.—*LINNEAN SOCIETY OF LONDON.*

Journal Asiatique, April May, 1872.—*LA SOCIÉTÉ ASIATIQUE DE PARIS.*

Journal of the Chemical Society, May to July, 1872.—*CHEMICAL SOCIETY OF LONDON.*

Journal of the Statistical Society of London, Vol. XXXV, Pt. II,—*STATISTICAL SOCIETY OF LONDON.*

Quarterly Journal of the Geological Society, Nos. 110, 111.—*GEOLOGICAL SOCIETY OF LONDON.*

Monatsbericht, März, April, 1872,—*KÖNIGLICH PREUSSISCHE AKADEMIE DER WISSENSCHAFTEN ZU BERLIN.*

Jahrbuch, Band XXI, No. 4, XXII, No. 1.—*IMPERIAL GEOLOGICAL INSTITUTE OF VIENNA.*

Bijdragen tot de Taal land-en Volkenkunde Van Nederlandsch Indie, Vol. VI, 2e stuk, 3e stuk.—*VOLKENKUNDE VAN NEDERLANDSCH INDIE.*

Natuurkundig Tydschrift voor Nederlandsch Indie. Deel XXXII, Zevende-Serie, Afl 1-3.—KONINKLIJKE NATUURKUNDIGE VEREENIGING IN NEDERLANDSCH INDIE.

Annals de la Société Impériale d' Agriculture, Histoire Naturelle, et Arts utiles de Lyon, Tom. I, II, 4 series.—SOCIÉTÉ IMPÉRIALE D' AGRICULTURE DE LYON.

Proceedings of the Royal Geographical Society Vol. XVI, No. 2.—ROYAL GEOGRAPHICAL SOCIETY OF LONDON.

Proceedings of the Royal Society, Vol. XX, Nos. 134, 135.—ROYAL SOCIETY OF LONDON.

Catalogue of Ruminant Mammalia (Pecora, Linnæus) in the British Museum, By J. E. Gray, F. B. S. F. L. S.—TRUSTEES OF THE BRITISH MUSEUM.

Magnetical and Meteorological Observations, Vol. I.—DIRECTOR, MAGNETICAL METEOROLOGICAL OBSERVATORY, BATAVIA.

Tagore Law Lecture, 1872, by Herbert Cowell, Esq.—REGISTRAR CALCUTTA UNIVERSITY.

The Holy Bible in the Sanserit language, Vol. IV.—THE REV. C. B. LEWIS.

Phormium Tenax, as a Fibrous Plant. By James Hector, M. D., F. R. S.—THE AUTHOR.

Further Papers relative to the preparation of the Phormium Fibre.—By James Hector, M. D., F. R. S.—THE AUTHOR.

Calcutta Journal of Medicine, May June, 1872.—THE EDITOR.

Christian Spectator, August, September, October, 1872.—THE EDITOR.

Professional Papers on Indian Engineering, Vol. I, No. 5, by Major A. M. Lang.—THE EDITOR.

Rámáyana, edited by Hem Chandra, Vol. II, No. 16, Vol. III, No. 1.—THE EDITOR.

The Thanatophidia of India, being a description of the venomous snakes of the Indian Peninsula by J. Payrer, M. D., C. S. I., F. R. S. E.—THE AUTHOR.

Über Ein zum Weissen Yajus gehöriges phonetisches Compendium des Pratijnásútra, von A. Weber.—THE AUTHOR.

Indische Studien, Vol. XII.—THE AUTHOR.

Notes on the Raptorial Birds of India. By A. Anderson F. Z. S.—THE AUTHOR.

A Vocabulary of the Kashmíri Language. By W. J. Elmslie, M. A., M. D.—THE AUTHOR.

Vája-Sanei-Sauhitá of Mádhyandíniya S. khá of the White Yájurveda, Pt. IV, By Thákura Giriprasáda.—THE AUTHOR.

Flora Sylvatica, Pt. 24.—THE GOVERNMENT OF INDIA, HOME DEPARTMENT.

Selections from the Records of the Government of India, Dept. of Agriculture, Revenue, and Commerce, No. XC.—THE GOVERNMENT OF INDIA, DEPARTMENT OF AGRICULTURE, REVENUE, AND COMMERCE.

Report on Meteorology, Museum, and Horticultural Gardens, in the Province of Oudh, 1871-72.—THE GOVERNMENT OF BENGAL.

Tobacco, its cultivation and preparation in the Phillippine Islands.—THE GOVERNMENT OF BENGAL.

Selections from the Records of Government, North Western Provinces, Vol. VI, No. 2.—THE GOVERNMENT N. W. PROVINCES.

Report on the Sanitary Administration of the Panjab, 1870.—THE GOVERNMENT OF THE PANJA'B.

Report on the Meteorology of the Panjab, 1871. By A. Neil, M. R. C. S. L.—THE GOVERNMENT OF THE PANJA'B.

Memoirs of the Geological Survey of India, Vol. IX Pt. 1.—THE SUPERINTENDENT OF THE GEOLOGICAL SURVEY OF INDIA.

Records of the Geological Survey of India, Vol. V, Pt. III.—THE SUPERINTENDENT OF THE GEOLOGICAL SURVEY OF INDIA.

#### *Exchange.*

'The Athenæum, April to July, 1872.

Nature, Nos. 131-152.

#### *Purchase.*

Annals and Magazine of Natural History, June—September 1872.—London, E. and D. Philosophical Magazine, June 1872.—Revue des Deux Mondes, 1st May to 1st September 1872.—Revue de Zoologie, Nos. 3-6.—Revue Archéologique, Nos. 4-8, 1872.—Revue Linguistique, Tome Quatrième 4 Fasc. Tome Cinquième 1 Fasc.—American Journal of Science, May to August, 1872.—The Ibis, July 1872.—Journal des Savants, May-July 1872.—Comptes Rendus, Vol. LXXIV, Nos. 19-26, 1872, LXXV, Nos. 1-9, 1872.—Reeve's Conchologia Iconica, parts 292, 293.—Indian Antiquary, August to October 1872.—Reisen im Archipel der Philippinen, Band II, Heft III, von Dr. C. Semper.—Rig-Vida-Sanhita—Vol. V. By Max Müller M. A.—Calcutta Review, October, 1872.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR DECEMBER, 1872.

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The Monthly General Meeting of the Society, was held on Wednesday, the 4th instant, at 9 P. M.

T. Oldham, Esq., LL. D., President, in the chair.

The minutes of the last meeting were read and confirmed.

Mr. Wood-Mason exhibited on behalf of A. Wallis Paul, Esq.,—

The sides of a stone box and of a copper box found in Hátkhólá, Chittagong, together with two figures.

The following letter accompanied them.

‘About the middle of March last, I was informed by the police of Maiscal\* (Máheshkhali) thána, that a stone chest containing two idols had been found in the house of a Hindú, living at Hátkhólá in Thákurtalá, and at the same time they sent the two images, which are now with you. They did not say that there was anything else. Some time after this I heard that some money and a small metal box were in the chest when found, but had not been given up by the finder. On a second order being sent, the pieces of metal, now with you, were given up, but all knowledge of the existence of treasure was denied.’

‘There is no certainty as to the date of its discovery. The finders declare that they gave information to the police instantly, and have delivered up all they found, *viz.*, the chest, fragments of the box, and the images. The mohunt of the Adhináth at Thákurtalá, is, however, of the opinion, that the box was discovered some two years ago, but its existence concealed from

\* Maiscal is a large island, extending from opposite Cox’s Bazar away to the north.

fear, and that it contained some Burmah gold (which is very pure and much prized down in Chittagong) or gold coins, which the finder has appropriated.'

'The common people consider that the chest and images are merely a charm, used in ancient times by the Maghs, to keep off evil spirits and Jinus, and to bring prosperity on the house where it lies.'

'Several respectable Maghs have seen the chest and images, but do not agree as to their precise meaning.'

'Cherra Phru Chaudharí, a zamíndár in Nhilla, and Momphrú the interpreter at Cox's Bazar, say that the figures are all numerical, and represent certain mystical formulæ to keep persons and spirits off from the box, and thus preserve the treasure which must have been found with it. This treasure either consisted of gold or some white fluid metal (as I understood the description) resembling quicksilver. The images according to this theory, were placed there to act as guardians, having their hands and legs tied for security.'

'Guní Mizi Thákúr, Raolí of Harbágh, (and also to Káliní Rání, one of the Hill Tracts chiefs) a highly respectable, well educated man, states as his opinion that the chest is intended to commemorate a victory by a Burmah Rájah over a Bengali or rather Musalmán one. He offered to decipher the inscriptions and find the date of the event, if an exact copy of the stones could be sent him.'

'The box was apparently found near the surface of the ground, by the finder while digging a hole for some posts.'

'The pieces of stone are marked North, South, East, West, top and bottom.'

The following presentations were announced—

1. From H. Beverley, Esq., C. S.,—Knotted ropes used by the Santáls in taking the census of 1872.

The following letter accompanied the donation—

'I beg to forward for deposit in the Society's Museum, should you think them worthy of a place there, a few specimens of the knotted strings that were used in the late Census Operations in the wilder parts of the Santál Parganas. The strings are of four colours,—black for male adults, red for female adults, white for boys and yellow for girls—each knot representing a unit of the population. The Census of these parts was thus taken by the people themselves through their own headmen, this being the national method of counting among the Santáls and being employed on this occasion in consequence of the inability of the headmen to read and write.'

'Some years hence the strings will doubtless be looked at with curiosity as relics of the barbarism that pervaded parts of Bengal before being subjected to the softening influences of a civilized Government.'

2. From Col. J. T. Walker, R. E., Superintendent G. T. Survey of India,—a copy of “Notes on the Harmonic Analysis of Tidal Observations.”

3. From Babu Rámnaráin, through the Hon’ble E. C. Bayley, C. S. I.,—four Diamonds, said to have been found in the bed of a hill stream near Simla.

4. From the Chief Commissioner of Maisúr,—a copy of Memorandum, by R. Cole, Esq., Superintendent of Inám Settlements, Maisúr, on certain copper grants found during the settlement of the Ináms in the Malnád or Hill-Tracts of the Nagar Division with translations of the inscriptions.

*Memo. on Certain Copper Grants found during the settlement of the Ináms in the Malnád or Hill-tracts of the Nagar Division.*

1. During my investigation into the ináms located in the Malnád talooks of the Nagar Division, I had occasion to inspect the copper grants held by the Agrahárdárs of the villages noted below.

1. Kuppagadde, Soruba Talook.

2. Gauja, Anantapura do.

3. Bhimanna Katté Matha of the Kávalédurga Talook.

These grants are of undoubted antiquity, and are said to have been made by Janaméjaya who is mentioned in the Vishnu Purána as the son of Parikshit, who was the grandson of Arjuna, who again was one of the five sons of Pándu, whose adventures and exploits are narrated in the great epic poem of the Mahá Bharata.

2. These grants are said to have been executed in the 111th year of the Kaliyuga, or 2990 years before Christ, according to the system of Hindu chronology hitherto in vogue; but Professor Wilson has formed an opinion that Parikshit, the grandson of Arjuna, with whose reign the Kaliyuga commences, could not have lived before the 13th century B. C. Professor Wilson would appear to have adopted this era by shewing that Sandracottus of the Greek writers was the Chandragupta of Hindu history. Mr. J. Garrett, the Director of Public Instruction in Mysore and Coorg, adopting this basis for Hindu chronology, is of opinion that Janaméjaya must have reigned some time in the 12th century B. C.

3. It will be observed in the translations of the grants for the Gauja and Kuppagadde Agrahárs, which have been rendered by my Personal Assistant, that these grants are said to have been made during the great “Sarpa Yága” or sacrifice of serpents, though the allusion to the solar eclipse is only made in the grant for the Gauj Agrahár. A copy of this grant was sent some years ago by Sir Mark Cubbon to Colonel Ellis, who was then Political Agent at Bundelkund. Colonel Ellis asserted that the solar eclipse alluded to in the grant was that of 1521 A. D., and drew the conclusion



that the Janamájaya alluded to must have been one of the Vijayanagar kings. Colebrooke denounced this grant as a forgery, and declared that the writing was modern, and that the errors in the composition betrayed gross ignorance.

4. The grant of the Bhímankatte Matha is dated in the 89th year of the era of Yudishtira, who was the eldest of the five brothers, the sons of Pándu by his wife Kunti or Putna. This Matha is situated on the banks of the Tunga and takes its name from a Katte, or anicut, partly natural and partly composed of huge blocks of stone, which Bhíma, another of the five sons of Pándu, is alleged to have hurled across the bed of the river so as to form the dam. I have begun the translation of the legendary account of the origin of this Matha, but, as pointed out by Mr. Narasimmaiengar, the doctrine of Madhváchár was only promulgated between 5 and 600 years ago. Whatever may be the origin of the Matha, the dam bears undoubted traces of the wondrous magnitude of the works of those days.

ROB. COLE,

*Supt. of Inám Settlements, Mysore.*

5th August, 1872.

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*Translation of the Copper Grant produced by the Agrahardars  
of Kuppagadde, Soraba Talook.*

#### SLOKA I.

*Jayatyávishkritam Vishnór.  
Váráham Kshóhhitárnavam :  
Dakshinónnata Damshtirágra.  
Vishránta Bhuvanam Vapuhu.*

The body of Vishnu, incarnate in the form of a boar, on the edge of whose lofty right tusk the earth rested, and which agitated and troubled the ocean, exists in transcendent glory.

Emperor Janamájaya ; the refuge of the whole universe ; the master of the earth ; the Mahárája of Rájás, the arbiter of Rájás ; the great Mahárája ; the master of Hastinápara, the Queen of cities ; the bestower of widowhood on the wives of the hostile princes of Aróha and Bhagadatta ; the sun of the lotus of the Pándava race ; the skilful in warfare ; whose sun-like bow resembled the Kálinga serpent ; the single handed hero ; the undaunted in battle ; the slayer of 'Asvapatiráya' and 'Disápata Gajapatiráya' ; the smi-

ter at the head of Narapatiráya; the terror of Sámana Mrga Chámara Konkana and the four quarters of the globe; the famous in Bharata Shástra\* consisting of pure Sálanga, Brahma Vina, &c., sprung from the mouth of Bramha; professor of many Shástras, the celebrated possessor of the 3 mantrás (charms) of Kórantaka Vyála Nága, &c., whose lotus-like feet are universally saluted; the fire of the abodes of inimical dynasties; the ever-bright; the son of others' wives; † the bearer of the flag of the golden boar; the most refulgent in the circle of Rájás; who is duly adorned; the descendant of the blessed lunar race; and the son of Emperor Parikshit reigning at Hastinápura in the midst of happy and virtuous amusements. During an expedition of conquest, at the confluence of the Tungabhadra and Haridra, at the shrine of Hariharadéva, in the dark half of the month of Chaitra of the year 111, on Monday combined with ‡ Bharani Nakshatra, Sankranti and Vyatipáta Nimitta, on the occasion of Sarpa Yága (serpent sacrifice) when the purnáhuti, or the rite of consummation was being performed, in the midst of 2,000 Brahmans, the Emperor granted in due form as an offering of blessing to Brahmans, of whom the principal were Mádhava Pattavardhana of Atréyagótra of Karnátaka race; Senkara ghalisaru of Vasishtagótra of the same race; Yógisvara Pattavardhanaru of Srivatsagótra, and Vishnu Dikshita, of Visvámitragótra of the said race; the village of Pushpagaddé, situated in the midst of Kampanaya Nádu, Yeppattu and Banavási Sahasra, together with the 9 subordinate villages of Bammahalli, Nittakki, Neehé, Korakódi, Annangaddé, Kodalikere, Gendana kulavalli and Kowndéyahalli, inclusive of the items of revenue comprehended by the terms Chakravarti mechi, Panchanga Pasáya, Chatra Sukhásana, Balidagadigé, Ankadanda khandana, and Ashtabhóga téjassámya.

The boundaries thereof are described below :—

On the north-east, a nulla at which the limits of Pushpagaddé, Háya and Kántapura villages converge.

South of the above, the bend of a stream at which the limits of Pushpagaddé, Háya and Vuddaré meet.

To the west of the above, Mathiya kola or pond so called near the boundaries of Kattaligé and Pushpagaddé.

To the west of the above, Báláya kola or pond so called where the boundaries of Pushpagaddé, Kadaligé and Tavanidhi meet.

To the west of the above, the boundaries of Tavanidhi and Pushpagaddé meet at a place called Lavadakattu.

\* Treats of Music and Pantomime.

† Chaste.

‡ Astronomical Symbols.

To the south-west, the limits of Pushpagaddé, Tavanidhi and Tekkúru meet at a rising called Moliya Maradi.

To the north of the above, Mágéru or mark so called defining the boundaries of Pushpagaddé, Tekkúru and Kolaga.

To the north of the above, Vuyanguddé marking the limits of Pushpagaddé and Kolaga.

To the east of the above, Pálágolla at which the boundaries of Pushpagaddé, Basúru and Tánaguppé terminate.

To the east, a stream, marking the boundaries of Pushpagaddé, and Tánaguppé, as also the boundary of Kántapura.

The boundaries from the east to the north-east (have been specified) are complete.

### SLOKA II.

*Sámányóyam Dharmaséltur Nripánám.  
Kálé Kálé Pálaniyó Bhavadbhihi.  
Sarvánétán Bhávinah Párvhivéndrán.  
Bhúyobhuyó Yáchaté Rámachandruha.*

Rámachandra again and again entreats all future kings and rulers. "This (grant) which is a bridge of charity common to all rulers, should be protected from time to time by you."

### SLOKA III.

*Svadattám Paradattám Vú.  
Yóharéta Vasundharám.  
Shashktir Varsha Sahasráni.  
Vishtáyám Jáyaté Krimiki.*

Whoever usurps (or takes away) land, which has been granted either by himself or others, will be born a worm in human offal, (and will suffer there) for sixty thousand years.

### SLOKA IV.

*Bramhasvatvam Visham Ghóram.  
Narisham Vishamuchyaté :  
Vishamékukinam Hanti.  
Bramhasvam Putra Powtrakam.*

The Brahman's property is a virulent poison, and poison is not called poison, (because) poison kills a single person, but Brahman's property slays the whole race, inclusive of the sons and grandsons.

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*Note by Translator.*

Kuppagaddé is an Agrahár about 8 miles from Soraba, and situated in that Talook. It is called Pushpagaddé in the grant. The present occupants do not seem to be lineally descended from the original grantees, as their respective gótrás are different. The village, though styled agrahár, was to all intents and purposes Sarkár, but the result of the settlement will restore to it the status of an alienated village. The boundaries described in the Sásanam are not, with a few exceptions, identifiable.

The grant is engrossed on 3 sheets of copper protected by two more, one underneath and the other on the top, the whole clasped together by a massive ring of the same metal impressed with the seal of a boar at the point of soldering. The last sheet of the writing is broken towards the right-hand side, thereby rendering some of the 'Slokás' at the end unreadable.

The characters of the Sásanam are said to be 'Nandi Nágara,' and resemble those of the modern 'Bálaband,' although there are several differences, which mark the writing in the Sásanam as a separate dialect. The Sanskrit portion of the composition is not very creditable to the original composers, and abounds with inaccuracies. In the translation, they have been as far as possible rectified in the 'Slokás' at the commencement and termination. The Kanarese words used in the body of the grant do not impress one with its alleged antiquity when compared with those to be met with in old stone inscriptions, whose genuineness is guaranteed by their not being portable.

At the commencement in reciting the titles of Janamájaya, the words (chacha puta chacha puta) are inserted. It is not known to what they refer, and what is their meaning.

Certain eminent astrologers, who have been consulted on the subject, doubt the truth of the astronomical combinations said to have occurred on the day of the grant. It is a problem, however, which is best reserved for solution by learned antiquaries. The year of the grant is denoted by the letters (ka, ta, ka) being the first letters of 2 series in the Sanskrit alphabet. It is therefore, if true, 4861 years old, being executed in the year 111 of the Kaliyuga, or 2960 years B. C. Janamájaya flourished at the commencement of the Kali age. It is mentioned, however, in a Sanad confirming the

village issued by Chennammáji, a female occupant of the gadi of Nagar in 1743, A. D.

ANANTAPURA,  
2nd January, 1872.

V. N. NARSUMMAIENGAR.

Bábu Rajendralála Mitra remarks on these grants as follows.—

'The copper grants are the most daring and barefaced forgeries that I have ever seen. The character, modern Bálaband, in which they are inscribed, the style of their invocations, the imprecatory verses with which they close, the existence in their texts of Kanarese words, the gross orthographic and etymological errors which disfigure them, and the references they make to modern names of places, leave no doubt in my mind that they have been got up with a view to establish the right of certain persons to enjoy rent free the villages named in them. Records dating from 2990 years before Christ, cannot be expected to be inscribed in Bálaband, or to use Kanarese words. Sanskrit, five thousand years ago, must have been very different from what the writer has used for the invocations and imprecations; and it is extremely doubtful if the language of the Bráhmans had penetrated so far down into the peninsula as Malnád at that time; no European orientalist believes that it had then ever come to the North-West frontier.'

5. From Munshi Gangaprasád, Deputy Collector, Murárábád—6 copper coins found in Mauza' Sarthal, Parganah Bilári, and 4 silver coins found buried under ground at Kankar Khera, a village about 11 miles north of Murárábád.

6. Bábu Rájendralála Mitra submitted facsimiles of two inscriptions, received from Bábu Rásh Bihári Bose, of Bánka, zila' Bhágulpúr. One of them runs as follows:—

सर्वोर्व्यपतिचक्रचूडामणिरक्षितयेणिश्रीर्षकोणचर्षणनिर्वालोक्तचरणनखगणमहाराजाधिराज श्रीश्रीमदकबरसाहादेवपादा(का)ख्यातदानाज्ञातबवाविगवत् दीनयेणिदैव्यसद्भूदेवदेवकुलकमलप्रकाशभास्वर श्रीमरीहाजिरहागलखानः शक्ति वारेन्दुवाणमोने माधवमासे मच्छीदरुन्दिरादीनि दत्तवान् । मन्नाविन्द्यधिपे निवेदनं । मया कृतमिदं कर्म यः करोति च पालनं । तस्य दामस्य दासोऽहं भवेथं जन्म जन्मनि ॥ हि स १०००

*Translation.*

In the month of *Madhava* (Baisákha, April—May) S'áka year 1517. S'ri Marri Háji Rahágal Khán, a sun manifest in the lotus of a pure Bráhma race, an humble follower of the faith (*Dín*) ——— of Danial ——— the descendant of the divine great king and king of kings, *S'rimat Akbar Sháh*, whose toes are wiped of their dust by the friction of the corners of lines of jewelled heads of lords of earth, dedicated masjids, temples, &c. His address to future kings. "I shall be his servant's servant, birth after birth, who will protect this my work. H. S. 1000.

The Bábu remarked—

"This record is barely two hundred and eighty-nine years old. It was put up by a Bráhmaṇ pervert to Moslemism, whose Muhammadan name is Rahágal Khán. He had performed a pilgrimage to Mecca, whence his title Háji. What his other title *Marri* means, I cannot make out. I have failed also to make out what relation he bore to Prince Danial whose name he invokes: probably he was a petty commander in the division under that prince. The name of the prince is written Dánálá, and the title which follows, probably a corrupt Persian or Arabic word, runs thus *tababábi-gabat*. The epithet which occurs next is *Dina-s'renídanya*, literally a poor man or beggar (*danya*) in the line *s'reni* of poor men, (*dina*); but I fancy the *dina* here is the Arabic *din* or faith, and *danya*, its derivative, a follower of the faith. Akbar, the father of Danial, is described as a *deva* or god, which is by no means so extravagant as the popular epithet *Dillís'varová jagadís'varová*, "Lord of Delli, or the Supreme Deity;" ascribed to him and his descendants. The other titles applied to him are in perfect keeping with this epithet.

"The character of the record is an old form of Bengali, and the language is Sanskrit; but its orthography is throughout corrupt. At the bottom of the record occurs the figure of a donkey, the object of which is not manifest to me.

"The character of the second inscription is very like that of the preceding, but the facsimile is so smudgy that it cannot be read. The figure at the bottom of the record is an elephant instead of a donkey."

7. From the Hon'ble E. C. Bayley, C. S. I., on the part of Mr. E. Thomas, the following readings of rare Bengal coins, now in possession of Col. Guthrie.

#### COINS OF ALTANISH.

No. 1. Silver. Size, 7½. Weight, 168 grs. *Very rare.* A.H. 614.

OBVERSE.

السلطان المعظم شمس الدنيا والدين ابو المظفر البمش القطبي ناصر امير المؤمنين

REVERSE.

Horseman at the charge.

Margin—

لا اله الا الله [محمد] رسول الله بقاينه سنة اربع عشر وستمائة

No. 2. Gold. Weight, 70·6 grs. *Unique.* Gaur, A. H. 616. New reading.

For the figure, *vide* 'Chronicles of the Pathán kings,' p. 78.

OBVERSE.

السلطان المعظم شمس الدنيا والدين ابو المظفر البمش القطبي برهان امير المؤمنين\*

\* Qilij Arslán, the Seljúq of Anatolia (A.H. 656), uses this title of برهان امير المؤمنين (Fraehn, p. 156). The three sons of Kai Khusráu (A.H. 647) employ the term in the plural براهين.

## REVERSE.

Horseman at the charge.

In the field—ضرب بکور

Margin—لا رسول الله بتاريخ سنة ست عشر وستمائة

No. 3. Silver. Size, 7. Weight, 168 grs. *Very rare.* A.H. 616.

## OBSERVE.

السلطان المعظم شمس الدنيا والدين ابوالمظفر الدمشقي القطبي برهان

## REVERSE.

Horseman at charge. لا اله الا الله محمد رسول الله

Margin—بقراريخ سنة ست عشر وستمائة

No. 3a. Variety. Weight, 162 gr. Date illegible. The Persian legend on the obverse is given in very imperfectly defined characters, and offers the peculiarity of the insertion of the Hindi letters *श*, for *Shāh*, above the name of the king, thereby indicating that both die-engravers and the local public were naturally better versed in the old alphabet than in the newly imported letters of the conquerors.

## COINS OF GHĪYĀS UD DĪN 'AWZ.

No. 4. Silver. Size, 7½. Weight, 161 grs. (full weight.)

A.H. 616. (7 specimens.)

## OBSERVE.

السلطان المعظم غياث الدنيا والدين ابو الفتح عوض بن الحسين ناصر امير المؤمنين

REVERSE. لا اله الا الله محمد رسول الله

Margin—ضرب هذه السكة في شهر سنة ست عشر وستمائة

No. 5. Silver. Size, 8½. Weight, 165 grs. A.H. 617. (2 specimens.)

## OBSERVE.

السلطان المعظم غياث الدنيا والدين ابو الفتح عوض بن الحسين ناصر امير المؤمنين

REVERSE. لا اله الا الله محمد رسول الله

Margin—ضرب هذه السكة في التاريخ السابع عشر وستمائة (؟)

No. 6. Silver. Size, 8. Weight, 169. (Coarse badly formed legends).

A.H. 617. (3 specimens.)

## OBSERVE.

السلطان الاعظم غياث الدنيا والدين ابو الفتح عوض بن الحسين ناصر امير المؤمنين وولي عهده علا الحق والدين

## REVERSE.

لا اله الا الله محمد رسول الله الناصر لدين الله امير المؤمنين

Margin—ضرب هذه السكة في شهر سنة سبع وستمائة

One example gives the varied reading of ضرب هذه السكة في ربيع الآخر سنة سبع وستمائة

Al-Nāṣir li dīn-illah was invested in the Khilāfat in A.H. 575, and died on the 1st Shawwāl, A.H. 622 (5th October, 1225 A.D.).

No. 7. Silver. Size, 9. Weight, 169 grs. Dated 20th of Rabi' ul ákhar A.H. 620. (7 specimens.)\*

OBVERSE.

غياث الدنيا والدين أبو الفتح عوض بن الحسين قسيم أمير المؤمنين سلطان السلاطين  
في الدنيا والدين أبو المظفر على يده أمير المؤمنين خلد الله ملكه

REVERSE.

لا إله إلا الله محمد رسول الله الناصر لدين الله أمير المؤمنين

في التاريخ العشرين من شهر ربيع الآخر سنة عشرين وستمائة—Margin

No. 7a. Variety. Weight, 165 grs. Coin of the same date and similar character, which transfers the complete name of عوض into the third line: the dubious prefix to the second الدنيا والدين reads more as معز, while the suggested يده, above given, appears as يدنو.

No. 8. Silver. Size 8½. Weight, 168 grs. Square-Kufic characters which seem to belong to Lāhor or some northern Mint. A.H. 62x.?

OBVERSE.

السلطان المعظم شمس الدنيا والدين أبو المظفر إيلدش السلطان يمين خليفة  
الله ناصر أمير المؤمنين

REVERSE.

لا إله إلا الله محمد رسول الله الناصر لدين الله أمير المؤمنين

هذا الضرب ؟ عشرين وستمائة—Margin

Chronicles of the Pathān Kings, p. 15. Pl. i. figs. 4—8.

BENGAL COINS OF ALTAMSH SUBSEQUENT TO THE REASSERTION OF HIS  
IMPERIAL SWAY.

No. 9. Silver. Size 7. Weight, 168 grs. Bengal type of coin. A.H. 622.

OBVERSE.

السلطان المعظم شمس الدنيا والدين أبو المظفر إيلدش السلطان يمين خليفه الله  
ناصر أمير المؤمنين

REVERSE.

As in Nos. 6 and 7,—Coins of Ghīās-ud-dīn.

هذا الضرب في شهر سنة انى عشرين وستمائة—Margin

No. 10. Silver. Size 8. Weight 168 grs. (2 specimens), A.H. 624.

\* See also Marsden, No. DCCLVII., p. 564. There are two coins of this type in his collection in the British Museum.



## OBERSE.

السلطان الاعظم شمس الدنيا و الدين ابو المظفر ايلدمش السلطان ناصر امير المؤمنين

## REVERSE.

لا اله الا الله محمد رسول الله الظاهر بامر الله امير المؤمنين

ضرب هذ \* \* \* شهر سنة اربع و عشرين و ست مائة—Margin

Al Zahir beamrillah, the Khalifah, whose name is inscribed on this coin, succeeded his father on the 2nd of Shawwâl, A.H. 622, and died on the 14th Rajab, A.H. 623 (July 11, 1226 A.D.). Bar Hebræus, *Abulfaraj*, p. 302.

No. 11. Silver. Size, 7. Weight 167 (one specimen). A.H. 624.

Square area, within double lines, following the pattern of some of the examples of Muhammad Ghori's coins.

## OBERSE.

السلطان الاعظم شمس الدنيا و الدين ابو المظفر ايلدمش السلطان ناصر

The words امير المؤمنين are inserted in the interstices between the square area and the circular marginal line, in the Delhi coins of Bahrâm Shâh. *Vide* Chronicles of the Pathân Kings, p. 118.

## REVERSE.

Legend in the area as in the last coin.

Margin—ضرب \* \* \* سنة اربع و عشرين و ست مائة

No. 12. Silver. Size 9½. Weight, 168. *Unique*. A.H. 627?

## OBERSE.

المستنصر بالله امير المؤمنين السلطان الاعظم شمس الدنيا و الدين ابو الفتح ايلدمش السلطان برهان امير المؤمنين

## REVERSE.

السلطان العادل شهنشاه باذل علا الدنيا و الدين ابو الغازي دولتشاه بن مودود عضد خليفه الله ظهير امير المؤمنين

Margin—شهور سنة سبع و عشرين و ست مائة

The reading of ابو الغازي is speculative: the letters are distinct, as are also the two dots of the ي, but that letter *itself* cannot be traced, and the visible remains of the character succeeding the letters are more like ل or لي than the suggested زي.

Mr. Blochmann said—

The coins described by Mr. Thomas belong to Col. Guthrie. They had been photographed, and he had much pleasure in submitting a copy to the members.

The valuable coins of Iltitnish (Altamsh) marked 11, 12, 13, on the photograph, have enabled Mr. Thomas to give a correct reading of the unique gold coin of that king, published on p. 78 of his 'Chronicles of the Pathân Kings.'

Of the other coins, the most valuable is the unique Daulatshāhī silver coin, No. 16 on the photograph and No. 12 in Mr. Thomas's readings. Together with the Ghiāsuddīn 'Iwaz coins, it forms one of the earliest specimens of Muhammadan coinage in Bengal. 'Alāuddīn Daulatshāh seems to be the Malik 'Alāuddīn Jānī mentioned in the *Ṭabaqāt i Nāṣirī* (Bibl. Ind. Edition, pp. 174, 178). The royal titles assumed by the early Bengal Governors were customary in those days; *vide* the inscription by 'Izzuddīn Abul Fath Tughril from Bihār (A. H. 640, or A. D. 1242), Pl. vii. of the Journal, A. S. Bengal, Pt. I, for 1871.

Of the Ghiās 'Iwaz coins, Mr. Thomas's No. 7 (Nos. 8 and 9 of the photograph) was published by Marsden. It is curious that the coin does not give him the name *Husāmuddīn*, which he has in the *Ṭabaqāt*.

The name 'Iwaz must not be pronounced 'Auz, a form which is not usual as a name. It implies that the parents look upon the son as "a substitute" ('iwaz) for a deceased elder son, and is therefore the Arabic equivalent for the more vulgar 'Tinkaurī,' 'Pānchkaurī,' and 'Sātkaurī,' names so often used at the present day by the lower classes in India; for 'tīnkaurī' also shews that parents have lost sons, and that they called the newborn son "Three Cowries-Worth," in order to induce the Angel of Death to spare so valueless a being. Or parents even sell such a child to lucky parents for the nominal value of three cowries, in order to make the Angel of Death believe that the child does not belong to them.

The accumulation of secondary, or *julūs*, names on Ghiāsuddīn's coins is extraordinary. The prose-rhyme, or *saja'*, is also noticeable.

Guided by the photograph, I would read the obverse of the Ghiāsuddīn Iwaz coin, No. 7 (Nos. 8 and 9, of the photograph) as follows:—

غياث الدنيا و الدين ابو الفتح عوض بن الحسين قسيم امير المؤمنين سلطان  
السلطين نور الدنيا و الدين ابو المظفر على يمين امير المؤمنين خلد الله ملكه

*Ghiāsuddunyā waddīn Abul Fath 'Iwaz, son of Al Husain, who shares (his property) with the Commander of the Faithful, the king of kings, the light of the world and of the faith, Abul Muzaṣṣar 'Alī, the right hand of the Commander of the Faithful—may God perpetuate his kingdom!*

The word نور (for the suggested معز) is very clear on No. 8 of the photograph, and even on No. 9, where the *wāw* has run into the *re*; *fi-l-dunyā* is impossible. The reading *yamīn* is clear, at least on No. 9 of the photograph; *yaduhu* or 'ala *yadīhi* makes no sense.

On the reverse of the Daulatshāh coin, the photograph suggests ابوالمعالی *Abul Ma'ālī*, for the unusual *Abul Ghāzī*.

Daulatshāh gives Ititmish the *julūs*-name *Abul fath*, whilst the coins of the Dihlī emperor have *Abul Muzaṣṣar*.

8. From the Government of Bengal,—a copy of Reports on the Survey Operations connected with the Lushai Expeditionary Force, Eastern Frontier, 1871-72.

9. From Professor A. Agassiz,—a copy of a Paper entitled Application of Photography to Illustrations of Natural History. With two figures printed by the Albert-type and Woodbury Processes.

10. From E. Gay, Esq.,—a copy of De Laët's *De Imperio Magni Mogolis, sive India Vera*. Leyden, ex officina Elzeviriana, anno 1631.—16mo. (rare). Also a copy of De Laët's *Persia, seu Regni Persiae Status*. Leyden, ex officina Elzeviriana, anno 1633.—16mo. (rare).

The following gentlemen duly proposed and seconded at the last meeting were elected Ordinary Members—

E. O'Brien, Esq., C. S.  
C. P. Bird, Esq., C. S.  
D. C. J. Ibbetson, Esq., C. S.  
Rev. A. F. R. Hoernle.  
Capt. E. Swetenham.  
Rev. C. H. Chard.  
Major J. G. Forbes, R. E.  
Bábu Pránanátha Pandit.

The following are candidates for ballot at the next meeting—

George Ludovic Houstoun, Esq., Johnstone Castle, Renfrewshire, proposed by J. Wood-Mason, Esq., seconded by Dr. T. Oldham.

J. Allen, Esq., proposed by L. Schwendler, Esq., seconded by Col. Hyde, R. E.

H. C. Williams, Esq., B. C. S., Chhindwára, Central Provinces, proposed by L. Schwendler, Esq., seconded by Dr. Stoliczka.

H. L. Dennys, Esq., Officiating Assistant Cotton Commissioner, Nág-púr, proposed by L. Schwendler, Esq., seconded by Captain J. Waterhouse.

Lieutenant R. Wace, R. A., Púná, proposed by L. Schwendler, Esq., seconded by Captain J. Waterhouse.

F. Schlegel, Esq., proposed by L. Schwendler, Esq., seconded by H. Blochmann, Esq., M. A.

Col. H. Drummond, R. E., proposed by Dr. T. Oldham, seconded by Captain J. Waterhouse.

Rev. J. D. Bate, missionary, Allahabad, proposed by J. Beames, Esq., C. S., seconded by H. Blochmann, Esq., M. A.

Col. J. F. Tennant, R. E. has intimated his desire to withdraw from the Society.

The following papers were read—

1. *Remarks on winds, typhoons, &c. on the South Coast of Japan.*—By  
COMMANDER H. C. ST. JOHN, *H. M. S., Sylvia.*

The most prevalent winds in the Southern parts of Japan are from the north-east.

Throughout an entire year, the proportion was as follows, taking 1000 hours as an index :—

Between N. and E. ....	500
"      N. and W. ....	200
"      S. and E. ....	100
"      S. and W. ....	0.99

During April, May, June, July, August and Sept. N. E. winds prevail, hauling more easterly in June, July and part of August. In August and September S. Easterly winds are most frequent than during any other months.

In October, variable winds prevail. The N. W. wind begins.

During November, December, January, and February, the N. W. winds prevail and blow hard. In March, the N. W. and N. E. winds are equally distributed.

The S. Westerly winds most frequently occur during the early parts of September.

It appears then the winds on the southern coasts of Japan are easterly during April,—(spring)—and hauling to the S. as the summer approaches pass through S. and W. to N. W. during winter, coming again through N. to N. E. and E. in spring and summer.

The numerous mountain ranges and high lands of Japan, appear mostly to run West and East. They are *cut into* by Bays and Channels, such as Kago-sima, Owari, Suruga, Uraga and Yedo Gulfs, and Bungo and Kii Channels. These numerous openings in the coast form funnels for the N. Westerly winter winds to blow down. This invariably will be found to occur, and fierce and strong these winds are, blowing hard gales for periods between three hours and thirty-six.

During winter a clear sky and bright day is generally a sure sign of a strong N. Westerly wind. Not unfrequently at the setting of the sun or moon, this wind dies away.

The Barometer is as likely to rise as remain steady previous to their commencement.

Gales from seaward or between East through South to West, occur at all times of the year. The Barometer will give certain warning, coupled with the appearance of the sky, clouds, &c.

Typhoons occur between June and October, inclusive. From the middle of August, to the middle of October, they may be expected to occur most frequently.

The usual tracks of these storms on the Japan coasts appear very regular. Approaching from the S. E. travelling about N. W. On reaching the

hot stream in about the latitude of the Bonin Islands, or between here and the Foochoo Islands, they begin to curve to the North and following the course of the Kuro Siwo, strike the South coasts of Nipon. Owing chiefly to the high land along the coast, the Northern disk of the storm becomes much flattened in, causing more easterly wind than would occur, if the storm were in Mid Ocean. Retaining the course of the stream, they pass along in a N. Easterly course, and, if not broken up previously, pass out into the Pacific Ocean on reaching Inahoya saki. Occasionally the centre of the storm passes over the Kii Peninsula, doing great damage, less by the wind, than by the floods, caused by the great quantity of rain, which falling on the high mountains, descends with violence the narrow gorges and not being able to escape quickly enough, inundates the inhabited and cultivated valleys, doing immense damage and not unfrequently sweeping villages, trees, &c., and most of the soil of the valley clean out to sea.

I have no instance of a typhoon passing to the westward along the coast of Japan. It is always on their recurving to the N. E. that they are experienced on these coasts.

Occasionally they evidently strike the eastern parts of the South coast of Japan when travelling due north. When such is the case, they appear to break up without extending far inland from the coast line.

The Barometer will almost invariably give warning on the approach of a typhoon. If falling with the wind at East or N. E. the sea approaching low and quickly, or other dirty appearances of the weather, or a heavy swell from the S. E., anchorage had better be obtained.

By the recurving of these storms and in their then easterly course along the S. E. coasts of Japan, usually (as previously remarked) the centre of the storm is some distance off the coast, and the northern disk only touches the land, consequently by the shifting of the wind from E. through N. to W. as the body of the storm travels E., the coast line becomes a weather shore, and if hove to on Port tack (the proper tack for the left hand disk of a cyclone in the Northern Hemisphere), a vessel is heading off the land.

It is thus shewn that there is no danger in being close to the land, but rather the advantage of smooth water is obtained. I would, however, always recommend a vessel to anchor in one of the numerous excellent harbours along the south coast of Nipon. This must be done on the first indications of the approach of a storm, as the weather soon becomes thick and the shore obscured. I am aware that many masters of vessels do not like anchoring when making a passage, I believe, in consequence of their owners looking on it in a light unfavourable to the masters. As a general rule, it must hold good, but it would be far more to their pecuniary advantage, if masters in charge of their ships and cargo, were not only encouraged but obliged, if possible, to make for a snug and safe harbour on the approach of a cyclone, and particularly on these coasts where harbours are numerous and good.

The expense from wear and tear and damage of cargo, and chance of loss, ships experience during the passage of a typhoon, is better to be avoided than experienced.

If a vessel finds herself on the Southern side of the centre of the storm, when on its easterly track, she will of course have the wind from South, shifting through W. to North, and must heave to on Starboard tack.

I am only speaking of typhoons on the S. E. coasts of Japan and only after they have recurved to the N. Eastward.

The diameters of these storms vary immensely. That they are usually of little height above the surface I have no doubt. I believe their thickness is more frequently less, than over, a mile. I have observed in a sudden break or rent in the thick mass of clouds which invariably accompanies them, the sky clear, blue and bright, the sun shining, and white touches of cumulus sprinkled across the sun's rays. These glimpses are almost momentary, and again the thick mass of driving clouds shut the bright spot out.

From numerous observations and notes I have been led to conclude that the China and Japan typhoons are never the same. In other words that those storms which sweep up the Northern coast of China between the Lats. of  $25^{\circ}$  and  $35^{\circ}$  approach from the S. E. as do the Japan storms, but instead of curving up with the Kuro-siwo, cross it and holding on in a N. Westerly direction, come in contact with the China coasts.

During the occurrence of such a storm on this part of the China coast, dirty squally weather with more or less rain will be probably experienced on the Western coast of Japan, or between Chickakoff and the Korea Straits. The wind will probably be from the S. E.

I believe that it may not be unusual to find yourself suddenly overtaken by a cyclone, which has given little or perhaps *no* warning. These I believe to be *descending* cyclones, if so, it may also account for the first half of the storm disk frequently lasting longer than the last. This circumstance I have more than once distinctly observed.

The usual rate that the body of the Japan cyclones travel at, is about twenty miles an hour.

2. *Notes on some species of Rhinolophida.*—By G. E. DOBSON, B. A. M. B.

3. *Ornithological Notes.*—By W. E. BROOKS, Esq., C. E.

These papers are published in Part II. No. 4, of the Journal.

4. *On Spirituous Drinks in Ancient India.*—By BABU RAJENDRALALA MITRA.

(Abstract.)

The author starts with the proposition that neither the anathema of sages and moralists, nor the deductions of science have ever sufficed to sup-

press the natural craving in man for spirituous drinks ; and to illustrate this, he recapitulates the various anathemas which have been hurled against drinking in the Hindu Sástras from time to time, and then quotes a number of instances to show that drinking prevailed to a large extent among the Brahmanical races in former ages. The instances are taken from the Vedas, the Sûtras, the Rámáyana, the Mahábhárata and other standard works. They are followed by an account of the various kinds of spirits which were known to the ancient Hindus, and the modes in which they were prepared. The nature and physiological effect of the Soma beverage are next described, and the paper is brought to a conclusion with an account of the *Sautrámani* rite in which libations of country arrack were formerly offered to the gods.

5. *Notes on some bats collected by CAPTAIN W. G. MURRAY, in the North-Western Himalaya, with description of new species*,—by G. E. DOBSON, B. A., M. B., Assistant Surgeon, H. M.'s British Forces.

While on a tour last summer in the north-western Himalaya, Captain Murray very kindly collected for me some specimens of the bats inhabiting that region. I find these specimens to represent three species of which one—a *Vespertilio*—has not been before described, and one is a well-known European *Rhinolophus* bat.

1. *Rhinolophus ferrum-equinum*, Schreber.

*Rhinolophus tragatus*, Hodgson, Journ. As. Soc. Beng. iv, p. 699.

An adult female specimen agreeing in all respects with specimens of *Rh. ferrum-equinum* from Europe. I have compared the original specimens of *Rh. tragatus* sent from Nipal by Mr. Hodgson, and find them in no respect different from the European *Rh. ferrum-equinum*. The geographical range of this species is, therefore, very wide. Other species of bats also extend from Europe to the Himalaya, and specimens from England and Nipal are either identical, or, should they be found to differ in any respect, differ only in the colour of the fur, a very unimportant character in distinguishing the species of Chiroptera. Among these species, the most common are *Barbastellus communis*; *Plecotus auritus*; *Vespertilio mystacinus*; *Vespertilio murinus*; *Vesperus serotinus*; and *Vesperugo noctula*. I have lately compared European specimens of the last named species with a specimen brought from Darjeeling by Dr. Stoliczka, and find no difference of any importance.

The specimen here referred to was taken by Captain Murray at an elevation of about 3000 feet, at Chuári in the native state of Chamba.

2. *Megaderma lyra*, Geoffroy.

*Megaderma spectrum*, Wagner, in Hügel's Kashmir, p. 569.

*Megaderma schistacea*, Hodgson, Journ. As. Soc. Beng., xvi. p. 889.

One of the most generally distributed species of bats in India. It extends from the foot of the Himalaya to the Western Ghats, and from the Panjáb to Ceylon. Hitherto, as far as I can ascertain, it has not been found beyond the limits of India.

There is now not the least doubt as to the identity of *M. spectrum*, Wagner, and *M. schistacea*, Hodgs. with this species.

The specimen here referred to was taken at Sujánpur Jira in the Kangra District, at an elevation of about 900 feet.

### 3. *Vespertilio macropus*, n. sp.

Head long, and very slightly elevated; muzzle narrow and pointed, with projecting nostrils opening sublaterally with an intervening emargination. The shape of the head and muzzle is similar to that of *V. (Kerivoula) Hardwickii*. Ears narrow, tapering, with rounded off tips; immediately beneath the tip about half the outer margin is hollowed out, the remaining lower half convex. Tragus very long and slender, slightly tapering towards the tip which is rounded off.

Wings from the ankles. Feet very large, about one-fourth the length of the head and body: toes more than half the length of the whole foot, claws remarkably long and strong: the outer toe\* is considerably shorter than the others, and has a somewhat larger claw.

Dentition.— in.  $\frac{2-2}{6}$ ; c.  $\frac{1-1}{1-1}$ ; p. m.  $\frac{3-3}{3-3}$ ; m.  $\frac{3-3}{3-3}$ .

The first and second upper premolars are very small, and not distinguishable without the aid of a lens.

This species is closely allied to *V. macrodactylus*, Temminck, from Japan, from which it is distinguished by measurement, and by the shape of the ears.

With *V. dasycneme*, *V. macrodactylus*, and *V. Hasseltii*, it forms a section of the genus *Vespertilio* distinguished by the remarkably large size of the feet which are quite free from the wing-membrane, and by the very small first and second premolars of the upper jaw.

Length, head and body 1·7 inches; tail 1·5; ear, 0·6; tragus 0·3; forearm 1·45; thumb 0·3; 2nd finger 2·3; 4th finger 1·8; tibia 0·6; foot and claws (not measured along the convexity) 0·4.

The specimens from which the above description was taken were obtained by Captain Murray in the caves of Bhima Devi, in Kashmir, at an elevation of about 6000 feet.

The following description of a new species of *Murina* has been founded on some specimens of a bat, preserved in spirits, in the Indian Museum, of

\* Corresponding, as Mr. Tomes has already remarked, to the inner toe in all other mammals, but external in bats owing to the rotation outwards of the whole posterior extremity by the wing-membrane.



which the first was sent from Darjeeling by Major Sherwill in 1853, and appears in Blyth's Catalogue as *Murina suillus*, Temm. Having lately obtained by exchange, from Dr. W. Peters of Berlin, a specimen of *Murina suillus*, Temminck, which had been compared with the type specimens, I was enabled to perceive that Major Sherwill's specimen which had been labelled *M. suillus*, Temm. was not correctly so named, and, further, that it differed as much from *M. suillus*, a Javanese species, as from the only other member of the genus, *M. grisea*, Hutton, from the N. W. Himalaya, lately described by Dr. Peters.\*

#### 4. *Murina cyclotis*, n. sp.

Muzzle and nostrils as in *M. suillus*. The ears are nearly as wide as long, and almost quite circular, the only interruption to the regular convexity of the external margin being a very faint flattening of the upper and outer portion, and a slight convexity opposite the base of the tragus. The tragus is shaped like that of *M. suillus*, but is considerably longer and tapers to a much finer point.

Wings attached along the outer toe as far as the base of the claw; feet small, toes of nearly equal length; extreme tip of tail alone free.

The upper surface of the interfemoral membrane is covered with hair which is most dense at the root of the tail, along the tibia, and on the calcanea; it also extends across the tibia to the wing-membrane. The back of the feet are closely covered with hair, which exceeds the toes in length.

On the upper surface the fur is bicolored, dark brown at the base with bright ferruginous tips; beneath paler brown throughout.

The wing-membrane extends further outwards and backwards along the outer toe than in *M. suillus*, occupying its entire outer side, the terminating claw being alone free. This distinguishes the species at once from *M. grisea* in which the wing-membrane extends only as far as the base of the first phalanx of the toe.

The first and second premolars in the upper jaw are well developed, and nearly equal in size, the first being slightly smaller than the second. The last molar is very narrow, being less than half the antero-posterior diameter of the antepenultimate molar.

Length, head and body, 1·7 inch; tail 1·5; ear (anteriorly) 0·6; tragus 0·35; forearm 1·3; 2nd finger 2·4; 4th finger 2·0; thumb 0·35; tibia 0·65.

Besides the original specimen sent by Major Sherwill others have since been received by the Museum from Captain Elwes, Dr. Stoliczka, and Mr. Mandeli, but all have been obtained at Darjeeling.

\* Monatsberichte, Berlin Akademie, April, 1872, p. 253.

## LIBRARY.

The following additions have been made to the Library, since the meeting held in November last.

*Presentations.*

\*.\* Names of Donors in Capitals.

Monatsberichte, Mai, Juni, 1872.—KÖNIGLICHE PREUSSISCHE AKADEMIE DER WISSENSCHAFTEN ZU BERLIN.

Sitzungsberichte der Kaiserlichen Akademie der Wissenschaften, Math.-Naturwissenschaftliche Classe, Band LXIV, Hefte I-V, I and II. Abtheilung.

Denkschriften, Math.-Natur. Classe, Band XXXI.—Sitzungsberichte, Philosophisch-Historische Classe, Band LXVIII, Heft II-IV, Band LXIX, Heft I-III.

Fontes Rerum Austriacarum (Oesterreichische Geschichts Quellen), Band XXXV.—THE IMPERIAL ACADEMY OF SCIENCES, VIENNA.

Zeitschrift, Band XXVI, Heft I, II.—THE GERMAN ORIENTAL SOCIETY OF LEIPZIG.

Mémoires de la Société des Sciences Naturelles de Cherbourg, Tome XVI.—SOCIÉTÉ DES SCIENCES NATURELLES DE CHERBOURG.

Proceedings of the Academy of Natural Sciences of Philadelphia, Pts. I to III, 1871.—ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.

Illustrated Catalogue of the Museum of Comparative Zoology, Nos. 4 to 6.—MUSEUM OF COMPARATIVE ZOOLOGY AT HARVARD COLLEGE, CAMBRIDGE, U. S.

Application of Photography to Illustrations of Natural History. With two figures printed by the Albert-type and Woodbury Processes.—By A. Agassiz.—THE AUTHOR.

Notes on the Raptorial Birds of India, Pt. IV.—By A. Anderson, F. Z. S.—THE AUTHOR.

Grammar of the Shan Language.—By J. N. Cushing.—THE AUTHOR.

Eighth Annual Report of the Sanitary Commissioner with the Government of India, 1871.—By J. M. Cunningham, M. D.—THE AUTHOR.

Calcutta Journal of Medicine, July and August, 1872.—THE EDITOR.

Christian Spectator, November and December, 1872.—THE EDITOR.

Professional Papers on Indian Engineering, Vol. I, No. 6.—By Major A. M. Lang.—THE EDITOR.

Rámáyana, edited by Hem Chandra, Vol. III, No. 2.—THE EDITOR.

Notes on the Harmonic Analysis of Tidal Observations, for the use of the Officers of the Great Trigonometrical Survey of India.—COL. J. T. WALKER, R. E.

De Laët, De Imperio Magni Mogolis, sive India Vera.—E. GAY, Esq.

De Laët, Persia seu Regni Persici Status.—E. GAT, Esq., M. A.

Catalogi Codicum Sanscriticorum.—By Th. Aufrecht, A. M.—THE GOVERNMENT OF BENGAL.

Reports on the Survey Operations connected with the Lushai Expeditionary Force, Eastern Frontier, 1871-72.—THE GOVERNMENT OF BENGAL.

Memoirs of the Geological Survey of India, Vol. IX, Pt. II.—THE SUPERINTENDENT OF THE GEOLOGICAL SURVEY OF INDIA.

Memoirs of the Geological Survey of India, Palæontologia Indica, Vol. IV, Pt. I.—THE SUPERINTENDENT OF THE GEOLOGICAL SURVEY OF INDIA.

Records of the Geological Survey of India, Vol. V, Pt. III.—THE SUPERINTENDENT OF THE GEOLOGICAL SURVEY OF INDIA.

*Exchange.*

The Athenæum, for August and September, 1872.

Nature, Nos. 153-156.

*Purchase.*

Annals and Magazine of Natural History, October 1872.—Revue des Deux Mondes, 1st and 15th October, 1872.—Revue de Zoologie, No. 8, 1872.—Revue Archéologique, No. 9, 1872.—Revue Linguistique, Tome Cinquième, II Fasc.—American Journal of Science, September, 1872.—Comptes Rendus, Nos. 10-15, 1872.—Journal des Savants, August and September, 1872.—Indian Antiquary, November, 1872.

# Meteorological Observations.

i

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1872.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea-level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	30.051	30.120	30.001	0.119	70.9	81.0	62.2	18.8
2	.057	.129	29.982	.147	72.4	80.7	65.8	14.9
3	.024	.110	.917	.163	72.5	80.4	66.4	14.0
4	29.961	.037	.902	.135	73.2	82.0	61.5	17.5
5	.983	.059	.934	.125	73.5	81.0	69.4	11.6
6	.995	.082	.949	.142	70.8	77.8	63.6	14.2
7	.973	.059	.899	.160	68.3	75.5	61.5	14.0
8	.884	29.953	.796	.157	66.8	75.5	62.0	13.5
9	.953	30.055	.881	.174	63.7	70.5	58.0	12.5
10	30.067	.150	30.015	.135	61.7	69.0	55.0	14.0
11	.022	.100	29.959	.111	62.3	71.8	54.6	17.2
12	.031	.102	.992	.110	64.3	74.2	56.4	17.8
13	.026	.103	.978	.125	66.3	78.6	56.8	21.8
14	.024	.094	.984	.110	67.6	77.5	58.8	18.7
15	.044	.116	.997	.119	68.7	78.0	57.5	20.5
16	.055	.139	.996	.143	66.4	77.6	56.4	21.2
17	.030	.124	.957	.167	67.0	77.5	58.3	19.2
18	.028	.120	.968	.152	70.1	78.0	64.0	14.0
19	.101	.198	30.032	.166	67.7	75.9	60.5	15.4
20	.110	.191	.044	.117	64.7	73.5	56.8	16.7
21	.068	.154	.005	.149	65.8	76.8	56.5	20.3
22	29.998	.082	29.918	.161	68.2	78.0	61.0	17.0
23	.982	.063	.931	.132	70.3	81.0	60.8	20.2
24	.994	.080	.940	.140	71.4	80.7	64.5	16.2
25	.999	.059	.953	.106	71.3	82.3	62.8	19.5
26	30.020	.097	.968	.129	71.2	76.8	65.0	11.8
27	.029	.124	.966	.158	72.0	78.6	67.4	11.2
28	.047	.118	.992	.126	71.7	78.0	65.6	12.4
29	.078	.160	30.019	.141	71.6	79.0	65.0	14.0
30	.065	.137	.006	.131	71.7	79.5	64.5	15.0
31	.045	.119	29.998	.121	72.5	80.5	65.2	15.3

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1872.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	65.6	5.3	61.4	9.5	0.518	6.02	2.21	0.73
2	67.7	4.7	63.9	8.5	.595	.51	.09	.76
3	68.2	4.3	64.8	7.7	.613	.72	1.91	.78
4	68.2	5.0	64.2	9.0	.601	.57	2.25	.75
5	69.2	4.3	66.2	7.3	.612	7.02	1.88	.79
6	65.6	5.2	61.4	9.1	.518	6.03	2.17	.74
7	61.5	6.8	56.1	12.2	.459	5.08	.52	.67
8	61.9	4.9	58.0	8.8	.489	.41	1.85	.75
9	56.7	7.0	50.1	13.9	.379	4.23	2.36	.64
10	54.3	7.4	47.6	14.1	.344	3.85	.34	.62
11	56.1	6.2	50.5	11.8	.380	4.25	.06	.67
12	58.9	5.4	54.0	10.3	.428	.76	1.96	.71
13	60.4	5.9	55.7	10.6	.453	5.00	2.15	.70
14	62.5	5.1	58.4	9.2	.496	.48	1.96	.74
15	60.4	6.3	55.4	11.3	.449	4.97	2.26	.69
16	60.3	6.1	55.4	11.0	.449	.97	.20	.69
17	61.4	5.6	56.9	10.1	.472	5.21	.09	.71
18	63.9	6.2	58.9	11.2	.504	.53	.43	.69
19	61.8	5.9	57.1	10.6	.475	.24	.22	.70
20	53.7	6.0	53.9	10.8	.426	4.74	.06	.70
21	60.4	5.4	56.1	9.7	.459	5.10	1.94	.72
22	62.6	5.6	58.1	10.1	.491	.42	2.16	.72
23	65.4	4.9	61.5	8.8	.550	6.05	.03	.75
24	66.8	4.6	63.1	8.3	.580	.37	1.93	.76
25	67.2	4.1	63.9	7.4	.595	.54	.79	.79
26	67.4	3.8	64.4	6.8	.605	.65	.65	.80
27	68.4	3.6	65.5	6.5	.628	.88	.62	.81
28	66.4	5.3	62.2	9.5	.563	.16	2.27	.73
29	66.5	5.1	62.4	9.2	.567	.22	.18	.74
30	66.8	4.9	62.9	8.8	.576	.31	.12	.75
31	68.3	6.2	61.3	11.2	.516	5.90	.64	.69

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	30.029	30.120	29.895	0.225	65.4	70.3	58.1	12.2
1	.020	.102	.891	.211	64.7	70.0	57.0	13.0
2	.010	.090	.890	.200	64.0	70.0	56.5	13.5
3	.000	.085	.885	.200	63.4	69.8	56.0	13.8
4	29.993	.072	.869	.203	62.9	70.0	55.5	14.5
5	30.006	.091	.874	.217	62.3	70.5	55.0	15.5
6	.021	.116	.882	.234	61.9	69.8	54.6	15.2
7	.010	.138	.899	.239	61.7	69.6	54.9	14.7
8	.071	.168	.936	.232	63.1	69.4	56.1	13.3
9	.096	.195	.950	.245	66.6	72.0	60.0	12.0
10	.103	.198	.953	.245	70.3	75.5	64.0	11.5
11	.089	.189	.941	.248	73.0	77.0	66.5	10.5
Noon.	.059	.153	.912	.241	75.1	80.0	67.5	12.5
1	.024	.118	.864	.254	76.3	81.1	68.0	13.1
2	29.994	.077	.830	.217	77.2	82.3	68.5	13.8
3	.977	.057	.815	.242	77.6	82.0	69.0	13.0
4	.969	.052	.796	.256	76.3	80.9	67.7	13.2
5	.973	.058	.799	.259	75.3	79.8	67.1	12.7
6	.984	.069	.825	.244	72.6	76.5	65.0	11.5
7	.999	.079	.849	.230	70.8	75.0	64.0	11.0
8	30.018	.101	.870	.231	69.4	74.0	62.6	11.4
9	.035	.120	.876	.244	68.3	72.5	61.7	10.8
10	.041	.135	.902	.253	67.2	71.2	60.5	10.7
11	.038	.133	.899	.234	66.3	70.6	59.0	11.6

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid. night.	62.4	3.0	60.0	5.4	0.523	5.81	1.14	0.84
1	61.8	2.9	59.5	5.2	.515	.72	.98	.84
2	61.4	2.6	59.1	4.9	.508	.65	.90	.83
3	60.9	2.5	58.6	4.8	.499	.56	0.97	.85
4	60.4	2.5	58.1	4.8	.491	.47	.96	.85
5	60.1	2.2	58.1	4.2	.491	.49	.82	.87
6	59.8	2.1	57.9	4.0	.488	.45	.78	.88
7	59.7	2.0	57.9	3.8	.488	.45	.74	.88
8	60.3	2.8	57.8	5.3	.486	.43	1.04	.84
9	62.2	4.4	58.7	7.9	.501	.55	.66	.77
10	64.0	6.3	59.0	11.3	.506	.56	2.52	.69
11	64.9	8.1	58.4	14.6	.496	.41	3.35	.62
Noon.	65.6	9.5	59.9	16.2	.504	.49	.85	.59
1	66.2	10.1	59.1	17.2	.508	.52	4.17	.57
2	66.4	10.8	58.8	18.4	.503	.45	.50	.55
3	66.6	11.0	58.9	18.7	.504	.45	.62	.54
4	66.1	10.2	59.0	17.3	.506	.50	.19	.57
5	66.0	9.3	69.5	15.8	.515	.60	3.80	.60
6	66.3	6.3	61.3	11.3	.546	.99	2.67	.69
7	65.7	5.1	61.6	9.2	.552	6.06	.14	.74
8	65.1	4.3	61.7	7.7	.554	.09	1.77	.78
9	64.3	4.0	61.1	7.2	.543	5.99	.61	.79
10	63.6	3.6	60.7	6.5	.536	.92	.43	.81
11	63.0	3.3	60.4	5.9	.530	.88	.27	.82

All the Hygrometrical elements are computed by the Greenwich Constants.

# Meteorological Observations.

v

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	<sup>o</sup>	Inches		lb	Miles	
1	136.5	...	W	...	37.3	B. Slightly foggy at 8 & 9 P. M.
2	136.7	...	W & W by S	...	41.1	B. Foggy from 4 to 8 A. M.
3	136.0	...	W by S & W	...	59.7	B to 1 P. M., $\sim$ i to 5 P. M. B to 11 P. M. Foggy from 4 to 7 A. M., & at 8 P. M.
4	137.5	...	W & W S W	...	55.2	B to 7 A. M., $\sim$ i to 5 P. M. B to 11 P. M. Foggy from 5 to 7 A. M.
5	135.3	...	W by S & W	...	47.0	B to 7 A. M. O to 9 A. M. B to 11 P. M. Slightly foggy at 6 & 7 A. M., & from 7 to 11 P. M.
6	131.0	...	N by E & W	...	59.4	B.
7	130.4	...	N NE	...	75.6	B.
8	131.5	0.22	N N E & N E	...	56.3	B to 3 A. M., $\sim$ i to 7 A. M., clouds of different kinds to 11 P. M. R at 6 & 9½ P. M.
9	148.3	...	N N E & N by W	...	137.9	B.
10	117.0	...	N & W N W	...	130.3	B.
11	131.0	...	W N W	...	96.5	B. Foggy at 10 & 11 P. M.
12	127.0	...	W N W	...	15.5	B. Foggy at midnight & 1 A. M., & from 7 to 11 P. M.
13	134.3	...	W N W & W	...	5.7	B. Slightly foggy at midnight & 1 & from 5 to 8 A. M.
14	131.2	...	S W & W by N	...	22.0	B.
15	124.5	...	W by N & S W	...	17.8	B. Slightly foggy from 7 to 11 P. M.
16	132.0	...	S W & E N E	...	20.9	B. Slightly foggy from 7 to 11 P. M.
17	130.8	...	E by N, N E & N N E	...	35.5	B. Slightly foggy from 7 to 10 P. M.
18	128.8	...	N N E, N E, & E N E	...	64.3	S to 7 A. M., $\sim$ i to 12 A. M. B to 11 P. M. Slightly foggy at 7 & 8 P. M.
19	128.2	...	N E	...	132.6	B to 4 A. M., $\sim$ i to 10 A. M. B to 11 P. M.

$\sim$  i Cirri, — i Strati,  $\sim$  i Cumuli,  $\sim$  i Cirro-strati,  $\sim$  i Cumulo-strati,  $\sim$  i Nimbi,  $\sim$  i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning, R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Miles	
20	123.8	...	N E & N N W	...	114.7	B to 11 A. M., \i to 7 P. M. B to 11 P. M. Foggy from 8 to 11 P. M.
21	130.0	...	N N W, N W & W	...	36.0	B to 8 A. M., \i to 11 A. M. B to 3 P. M., \i to 6 P. M. B to 11 P. M. Slightly foggy at midnight & 1 A. M., & from 7 to 11 P. M.
22	133.0	...	W N W	...	20.3	Chiefly B. Foggy from midnight to 2 A. M., & 7 to 10 P. M.
23	135.6	...	W by S & S by W	...	29.2	B to 7 A. M., \i to 11 A. M. B to 11 P. M. Foggy at 7 A. M.
24	136.0	...	S by W & S S W	...	91.9	B to 2 A. M. S to 9 A. M. B to 11 P. M. Slightly foggy from 3 to 9 A. M.
25	137.3	...	S S W	...	62.2	B to 12 A. M., \i to 6 P. M. B to 11 P. M. Foggy from 4 to 8 A. M.
26	136.3	...	S S W & S by E	...	73.5	B to 7 A. M., \i & \i to 11 P. M.
27	128.2	...	S S E & S S W	...	49.4	\i to 6 A. M. S to 9 A. M., \i to 4 P. M. B to 8 P. M. \i to 11 P. M. Slightly foggy at 7 & 8 A. M. & 9 P. M.
28	134.5	...	S S W & S	...	76.1	S to 3 A. M., \i to 8 A. M. B to 11 A. M., \i & \i to 11 P. M.
29	134.0	...	E S E & N E	...	48.7	B to 11 A. M., \i to 3 P. M., \i to 5 P. M. B to 11 P. M. Slightly foggy at 10 P. M.
30	139.0	...	E S E & N N W	...	27.2	B to 9 A. M., \i to 1 P. M., \i to 4 P. M. B to 11 P. M. Foggy from 6 to 8 A. M., & 8 to 10 P. M.
31	136.5	...	W S W	...	29.1	B to 5 A. M., \i to 6 P. M. B to 11 P. M. Slightly foggy at 9 P. M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January 1872.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	30.024
Max. height of the Barometer occurred at 10 A. M. on the 19th. ...	30.198
Min. height of the Barometer occurred at 4 P. M. on the 8th. ...	29.796
Extreme range of the Barometer during the month ... ..	0.402
Mean of the daily Max. Pressures ... ..	30.104
Ditto ditto Min. ditto ... ..	29.965
Mean daily range of the Barometer during the month ... ..	0.189

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	°
Mean Dry Bulb Thermometer for the month ... ..	68.8
Max. Temperature occurred at 2 P. M. on the 25th. ...	82.3
Min. Temperature occurred at 6 A. M. on the 11th. ...	54.6
Extreme range of the Temperature during the month ... ..	27.7
Mean of the daily Max. Temperature ... ..	77.7
Ditto ditto Min. ditto, ... ..	61.5
Mean daily range of the Temperature during the month ... ..	16.2

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Mean Wet Bulb Thermometer for the month ... ..	63.5
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	5.3
Computed Mean Dew-point for the month ... ..	59.3
Mean Dry Bulb Thermometer above computed mean Dew-point ...	9.5

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.511

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	Troy grain.
Mean Weight of Vapour for the month ... ..	5.63
Additional Weight of Vapour required for complete saturation ...	2.08
Mean degree of humidity for the month, complete saturation being unity	0.73

	°
Mean Max. Solar radiation Thermometer for the month ... ..	132.7

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	Inches.
Rained 1 day,—Max. fall of rain during 24 hours ... ..	0.22
Total amount of rain during the month ... ..	0.22
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... ..	0.19
Prevailing direction of the Wind ... .. W. N. W., W. & N. N. E.	

\* Height 70 feet 10 inches above ground.

*Abstract of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of Jan. 1872.*

### MONTHLY RESULTS.

Tables showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1872.*

Latitude  $22^{\circ} 33' 1''$  North. Longitude  $88^{\circ} 20' 34''$  East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	30.035	30.120	29.978	0.142	73.3	81.0	67.8	13.2
2	.009	.086	.143	.143	73.9	82.7	68.0	16.7
3	29.999	.074	.952	.122	73.6	80.0	67.3	12.7
4	.980	.047	.941	.106	72.3	78.7	66.9	11.8
5	.958	.047	.900	.147	71.0	78.7	63.8	14.9
6	.904	29.989	.852	.137	72.1	78.0	66.5	11.5
7	.849	.912	.809	.103	68.9	72.0	66.2	5.8
8	.898	.965	.834	.131	67.8	74.5	62.0	12.5
9	.951	30.025	.892	.133	64.6	71.9	58.0	13.9
10	.928	.006	.866	.140	66.1	75.2	58.0	17.2
11	.904	29.981	.846	.135	69.8	79.5	60.5	19.0
12	.935	30.001	.895	.106	73.6	81.0	67.0	14.0
13	.938	.014	.876	.138	74.3	81.9	67.0	14.9
14	.964	.049	.909	.140	74.2	82.0	66.8	15.2
15	.965	.042	.919	.123	72.6	79.5	67.5	12.0
16	30.039	.133	.981	.152	68.7	77.0	60.5	16.5
17	.031	.114	.977	.137	69.0	78.3	60.8	17.5
18	.006	.096	.941	.155	70.7	80.4	61.7	18.7
19	29.971	.045	.903	.142	73.5	83.2	65.0	18.2
20	.985	.070	.907	.163	74.9	83.0	68.5	14.5
21	.964	.053	.904	.149	75.2	81.7	70.0	11.7
22	.950	.027	.896	.131	73.8	82.0	65.0	17.0
23	.939	.078	.945	.133	73.9	83.3	64.5	18.8
24	30.020	.104	.965	.139	75.0	83.4	68.8	14.6
25	.009	.111	.921	.190	72.5	82.4	62.0	20.4
26	29.933	.020	.852	.168	74.0	84.2	64.2	20.0
27	.893	29.967	.842	.125	76.4	86.8	68.2	18.6
28	.893	.963	.841	.122	77.5	87.5	70.5	17.0
29	.839	.955	.833	.122	79.1	89.7	72.2	17.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

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taken at the Surveyor General's Office, Calcutta,  
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Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	68.9	4.4	65.4	7.9	0.626	6.84	2.00	0.77
2	67.8	6.1	63.5	10.4	.588	.42	.59	.71
3	68.1	5.5	64.2	9.4	.601	.57	.36	.74
4	66.3	6.0	61.5	10.8	.550	.02	.56	.70
5	64.4	6.6	59.1	11.9	.608	5.57	.68	.68
6	68.3	3.8	65.3	6.8	.623	6.83	1.70	.80
7	68.3	2.6	64.2	4.7	.601	.62	.12	.86
8	61.3	6.5	56.1	11.7	.459	5.08	2.40	.68
9	57.1	7.5	51.1	13.5	.388	4.31	.47	.64
10	53.8	7.3	53.0	13.1	.414	.59	.51	.65
11	61.7	5.1	60.6	9.2	.534	5.87	.08	.74
12	70.3	3.3	68.0	5.6	.681	7.44	1.49	.83
13	70.5	3.8	67.8	6.5	.677	.38	.74	.81
14	67.8	6.4	63.3	10.9	.584	6.37	2.72	.70
15	66.4	6.2	61.4	11.2	.518	.00	.66	.69
16	60.5	8.2	53.9	14.8	.426	4.70	.99	.61
17	61.2	7.8	55.0	14.0	.442	.88	.88	.63
18	61.4	6.3	59.4	11.3	.513	5.63	.55	.69
19	68.6	4.9	65.2	8.3	.621	6.80	.10	.76
20	70.9	4.0	68.1	6.8	.684	7.44	1.84	.80
21	71.6	3.6	69.1	6.1	.706	.69	.68	.82
22	61.6	9.2	58.2	15.6	.493	5.37	3.61	.60
23	65.6	8.3	59.8	14.1	.520	.67	.34	.63
24	65.2	9.8	58.3	16.7	.494	.37	.94	.68
25	62.6	9.9	54.7	17.8	.438	4.79	.84	.66
26	66.8	7.2	61.8	12.2	.555	6.06	2.98	.67
27	69.5	6.9	64.7	11.7	.611	.64	3.08	.68
28	72.5	5.0	69.0	8.5	.704	7.62	2.42	.76
29	73.7	5.4	69.9	9.2	.725	.84	.69	.75

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of February 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements.. dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid-night.	29.964	30.044	29.864	0.180	69.2	75.0	61.0	14.0
1	.955	.033	.856	.177	68.4	74.0	60.4	13.6
2	.945	.026	.842	.184	67.8	73.5	60.0	13.5
3	.937	.021	.826	.195	67.2	73.0	59.7	13.3
4	.932	.013	.817	.196	66.6	72.6	59.0	13.6
5	.915	.028	.823	.205	66.2	72.6	58.7	13.9
6	.958	.047	.825	.222	65.7	72.2	58.4	13.8
7	.977	.072	.831	.241	65.4	72.7	58.0	14.7
8	30.004	.102	.861	.241	67.4	73.6	60.0	13.6
9	.027	.120	.892	.228	70.8	76.3	63.4	12.9
10	.037	.133	.912	.221	73.8	80.5	65.5	15.0
11	.024	.122	.907	.215	76.3	83.4	67.5	15.9
Noon.	29.995	.091	.890	.201	77.8	85.0	69.0	16.0
1	.963	.050	.853	.197	79.0	88.3	70.2	18.1
2	.934	.016	.838	.178	79.9	89.5	70.5	19.0
3	.915	29.998	.829	.169	80.4	89.7	69.5	20.2
4	.905	.981	.818	.163	80.3	88.7	70.5	18.2
5	.904	.987	.809	.178	79.4	87.5	71.0	16.5
6	.916	.994	.813	.181	77.5	84.5	68.7	15.8
7	.925	30.003	.818	.185	74.9	81.5	66.2	15.3
8	.945	.026	.842	.184	73.2	80.0	65.0	15.0
9	.961	.040	.860	.180	71.9	77.0	63.5	13.5
10	.968	.049	.870	.179	70.8	76.0	62.5	13.5
11	.967	.050	.877	.173	70.0	75.6	61.9	13.7

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	66.1	3.1	63.6	5.6	.590	6.49	1.32	0.83
1	65.6	2.8	63.4	5.0	.586	.46	.16	.85
2	65.1	2.7	62.9	4.9	.576	.37	.11	.85
3	64.5	2.7	62.3	4.9	.565	.25	.10	.85
4	63.9	2.7	61.7	4.9	.554	.13	.08	.85
5	63.6	2.6	61.5	4.7	.550	.10	.02	.86
6	63.2	2.5	61.2	4.5	.544	.04	0.98	.86
7	62.9	2.5	60.9	4.5	.539	5.98	.97	.86
8	64.0	3.4	61.3	6.1	.546	6.05	1.34	.82
9	65.7	5.1	61.6	9.2	.552	.06	2.14	.74
10	66.8	7.0	61.9	11.9	.557	.08	.90	.68
11	67.2	9.1	60.8	15.5	.537	5.83	3.86	.60
Noon.	67.5	10.3	60.3	17.5	.528	.72	4.41	.57
1	67.8	11.2	60.0	19.0	.523	.65	.85	.54
2	67.9	12.0	59.5	20.4	.515	.55	5.23	.52
3	68.2	12.2	59.7	20.7	.518	.58	.36	.51
4	68.3	12.0	59.9	20.4	.521	.62	.29	.52
5	68.5	10.9	60.9	18.5	.539	.81	4.81	.55
6	68.9	8.6	62.9	14.6	.576	6.24	3.80	.62
7	68.6	6.3	64.2	10.7	.601	.54	2.74	.71
8	67.9	5.3	63.7	9.5	.591	.46	.36	.73
9	67.2	4.7	63.4	8.5	.586	.41	.07	.76
10	66.8	4.0	63.6	7.2	.590	.48	1.72	.79
11	66.7	3.3	64.1	5.9	.599	.59	.41	.83

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
1	136.3	...	W S W & S by W	...	28.2	S on E to 8 A. M., ~i to 3 P. M. B to 11 P. M. Foggy from 2 to 9 A. M.
2	139.0	...	Variable.	...	75.1	B to 1 A. M., ~i to 11 A. M. B to 11 P. M.
3	134.0	...	S W & N W	...	72.2	Chiefly B.
4	133.8	...	N by W & N by E	...	31.5	B to 6 A. M., ~i to 5 P. M., ~i to 8 P. M. B to 11 P. M. Light R at 7½ P. M.
5	140.8	...	N by E. NNE & SE	...	126.1	B to 4 A. M., clouds of different kinds to 2 P. M., ~i to 7 P. M. B to 11 P. M.
6	133.7	...	S S E & S S W	...	82.5	B to 4 A. M., ~i to 11 A. M., ~i to 5 P. M. O to 11 P. M.
7	125.0	0.78	N W & variable.	0.8	108.2	O to 4 A. M., clouds of dif- ferent kinds to 4 P. M. B to 11 P. M. R from 0½ to 3 & between 4 & 5 A. M.
8	135.0	...	N W & W N W	...	85.9	B.
9	131.4	...	W by N [by S	...	87.6	B.
10	134.0	...	S by W, S W & W	...	98.0	B. Foggy at 5 & 6 A. M.
11	137.0	...	W by S & S S W	...	76.4	B to 7 A. M., ~i to 10 A. M., ~i to 4 P. M. B to 11 P. M.
12	131.0	...	S S W & W by S	...	76.6	B to 3 A. M. S to 7 A. M., ~i to 6 P. M. B to 9 P. M., ~i to 11 P. M. Foggy from 2 to 7 A. M.
13	129.5	0.27	S W & E	...	94.5	Chiefly ~i R between 3 & 4 A. M.
14	131.0	...	E by N & ENE	...	119.1	~i to 8 A. M. B to 2 P. M., clouds of different kinds to 11 P. M. L on S W between 6 & 7 P. M. Light R at 9 P. M.
15	129.0	0.40	S by W & N by E	...	99.6	~i to 12 A. M. B to 11 P. M. Slightly foggy at 8 P. M. T & L at 5½ A. M. R at 5 & 6 A. M.
16	129.4	...	NNE & NNW	...	152.6	B. Foggy from 8 to 11 P. M.
17	131.0	...	NNW & W by S	...	71.2	B. Slightly foggy at midnight 4 & 5 A. M.

~i Cirri, ~i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,  
~i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning,  
R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles	
18	133.0	...	W by S & W S W	...	50.9	B to 10 A. M., ☽ to 6 P. M. B to 11 P. M.
19	139.0	...	SSW	...	68.7	B to 9 A. M., ☽ to 5 P. M. B to 11 P. M.
20	128.8	1.37	S by W & S S W	7.0	148.9	B to 8 A. M., ☽ to 6 P. M. O to 11 P. M. L at 7, 8 & 11 P. M. T at 7 & 11 P. M. High wind accompanied with rain & hail-stones feel in immense quantities between 7 & 8 P. M., & R at 10½ P. M.
21	135.6	...	S W & W	...	81.7	☽ to 6 A. M. B to 8 A. M., ☽ to 6 P. M. B to 11 P. M. Slightly foggy at 8 P. M.
22	132.0	...	W by N & N W	...	29.3	B to 5 A. M., ☽ to 7 A. M. B to 11 P. M.
23	132.8	...	W	...	83.5	B. Slightly foggy at 8 P. M.
24	135.0	...	W N W & W by N	...	48.7	B. Slightly foggy at 9 P. M.
25	133.8	...	W by N & W	...	42.3	P.
26	131.8	...	W S W & S W	...	47.6	Chiefly B.
27	133.0	...	S S W & SW	...	93.4	B.
28	137.4	...	S S W	...	67.7	B. Foggy from 3 to 8 A. M.
29	137.0	...	S S W & S	...	54.8	Chiefly B. Foggy from 3 to 8 A. M.

☽ i. Cirri, — i Strati, ☽ i Cumuli, ☽ i Cirro-strati, ☽ i Cumulo-strati, ☽ i Nimbi, ☽ i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning, R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of February 1872.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.958
Max. height of the Barometer occurred at 10 A. M. on the 16th. ...	30.133
Min. height of the Barometer occurred at 5 P. M. on the 7th. ...	29.809
Extreme range of the Barometer during the month ... ..	0.324
Mean of the daily Max. Pressures ... ..	30.038
Ditto ditto Min. ditto ... ..	29.901
Mean daily range of the Barometer during the month ... ..	0.137

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	°
Mean Dry Bulb Thermometer for the month ... ..	72.5
Max. Temperature occurred at 3 P. M. on the 29th. ... ..	89.7
Min. Temperature occurred at 7 A. M. on the 9th & 10th ... ..	58.0
Extreme range of the Temperature during the month ... ..	31.7
Mean of the daily Max. Temperature ... ..	80.7
Ditto ditto Min. ditto, ... ..	65.3
Mean daily range of the Temperature during the month ... ..	15.4

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Mean Wet Bulb Thermometer for the month ... ..	66.4
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	6.1
Computed Mean Dew-point for the month ... ..	61.5
Mean Dry Bulb Thermometer above computed mean Dew-point ... ..	11.0

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.550

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	Troy grain.
Mean Weight of Vapour for the month ... ..	6.02
Additional Weight of Vapour required for complete saturation ... ..	2.61
Mean degree of humidity for the month, complete saturation being unity	0.70

	°
Mean Max. Solar radiation Thermometer for the month ... ..	133.6

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	Inches.
Rained 7 days,—Max. fall of rain during 24 hours ... ..	1.37
Total amount of rain during the month ... ..	2.82
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... ..	2.34
Prevailing direction of the Wind ... .. S. S. W. & W. by N.	

\* Height 70 feet 10 inches above ground.

*Abstract of the Results of the Hourly Meteorological Observations taken at the S. G. O. Calcutta, in the month of Feb. 1872.*

### MONTHLY RESULT.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1872.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.937	29.996	29.865	0.131	78.8	89.0	71.5	17.5
2	.991	30.068	.941	.127	77.7	85.5	71.3	14.2
3	30.004	.070	.957	.113	78.2	87.0	70.7	16.3
4	.019	.094	.952	.142	79.0	88.0	70.0	18.0
5	29.974	.054	.900	.154	78.6	87.7	70.5	17.2
6	.933	.006	.841	.165	78.5	89.7	70.3	19.4
7	.961	29.988	.829	.159	77.7	87.0	69.5	17.5
8	.893	.971	.835	.136	80.4	89.0	74.8	14.2
9	.951	30.021	.900	.121	79.7	90.3	70.5	19.8
10	.939	.017	.859	.158	81.1	91.5	74.5	17.0
11	.852	29.926	.754	.172	82.4	92.7	76.0	16.7
12	.788	.867	.702	.165	83.7	94.0	76.6	17.4
13	.740	.811	.650	.161	84.4	95.2	77.3	17.9
14	.738	.829	.654	.175	85.0	98.0	77.0	21.0
15	.782	.851	.731	.120	84.1	95.5	73.6	21.9
16	.836	.884	.779	.105	84.3	93.0	78.0	15.0
17	.845	.909	.782	.127	84.1	94.5	77.0	17.5
18	.869	.951	.807	.144	83.7	92.5	77.0	15.5
19	.857	.946	.780	.166	83.5	91.7	76.6	15.1
20	.784	.858	.695	.163	84.0	92.4	78.3	14.1
21	.784	.848	.724	.121	83.9	93.7	77.5	16.2
22	.870	.943	.811	.132	84.2	93.5	77.5	16.0
23	.865	.960	.771	.189	84.8	95.0	78.0	17.0
24	.791	.872	.683	.189	85.1	96.4	76.7	19.7
25	.725	.786	.664	.122	84.0	95.0	76.7	18.3
26	.751	.831	.662	.169	85.2	96.0	77.7	18.3
27	.725	.788	.653	.135	86.3	98.5	78.0	20.5
28	.743	.818	.675	.143	86.1	96.5	78.5	18.0
29	.712	.766	.646	.120	85.0	95.3	77.6	17.7
30	.773	.852	.713	.139	85.4	98.7	78.5	18.2
31	.826	.898	.761	.137	85.2	93.5	78.4	15.1

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1872.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	70.2	8.6	64.2	14.6	0.601	6.49	3.95	0.62
2	68.9	8.8	62.7	15.0	.572	.20	.90	.61
3	68.4	9.8	61.5	16.7	.550	5.95	4.30	.58
4	69.1	9.9	62.2	16.8	.563	6.08	.42	.58
5	67.8	10.8	60.2	18.4	.527	5.70	.68	.55
6	70.3	8.2	64.6	13.9	.600	6.59	3.76	.64
7	71.7	6.0	67.5	10.2	.670	7.27	2.83	.72
8	74.4	6.0	70.2	10.2	.732	.89	3.05	.72
9	72.5	7.2	67.5	12.2	.670	.24	.48	.68
10	75.6	5.5	71.7	9.4	.768	8.28	2.89	.74
11	74.8	7.6	69.5	12.9	.715	7.68	3.93	.66
12	76.4	7.3	71.3	12.4	.758	8.13	.94	.67
13	76.8	7.6	71.5	12.9	.763	.16	4.15	.66
14	75.6	9.4	69.0	16.0	.704	7.51	5.02	.60
15	75.2	8.9	69.0	15.1	.704	.53	4.68	.62
16	78.9	5.4	75.1	9.2	.857	9.17	3.11	.75
17	77.4	6.7	72.7	11.4	.792	8.49	.72	.70
18	74.0	9.7	67.2	16.5	.664	7.10	4.97	.59
19	74.0	9.5	67.3	16.2	.666	.13	.87	.59
20	77.0	7.0	72.1	11.9	.778	8.33	3.84	.68
21	76.2	7.7	70.8	13.1	.746	7.99	4.14	.66
22	76.7	7.5	71.4	12.8	.761	8.13	.11	.66
23	76.4	8.4	70.5	14.3	.739	7.90	.56	.63
24	75.8	9.3	69.3	15.8	.711	.58	.90	.60
25	77.0	7.0	72.1	11.9	.778	8.33	3.84	.68
26	78.7	6.5	74.1	11.1	.830	.87	.74	.70
27	76.1	10.2	69.0	17.3	.704	7.50	5.52	.58
28	78.8	7.3	73.7	12.4	.819	8.74	4.21	.68
29	79.0	6.0	74.8	10.2	.849	9.07	3.46	.72
30	78.7	6.7	74.0	11.4	.827	8.84	.84	.70
31	79.1	6.1	74.8	10.4	.849	9.07	.54	.72

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.856	30.033	29.730	0.303	78.5	81.8	72.0	9.8
1	.845	.026	.723	.303	77.9	81.0	71.8	9.2
2	.834	.021	.703	.318	77.4	80.6	70.9	9.7
3	.824	.013	.687	.326	76.9	80.2	70.6	9.6
4	.820	.003	.671	.332	76.4	79.9	70.5	9.4
5	.835	.007	.682	.325	75.9	79.5	70.6	8.9
6	.853	.024	.705	.319	75.6	78.5	69.5	9.0
7	.876	.057	.731	.326	75.5	79.4	69.5	9.9
8	.899	.078	.754	.324	77.5	81.8	72.0	9.8
9	.914	.091	.764	.327	80.4	84.6	74.0	10.6
10	.917	.094	.766	.328	83.6	88.2	78.6	9.6
11	.907	.085	.763	.322	86.6	91.5	81.2	10.3
Noon.	.831	.060	.737	.323	89.0	93.8	83.5	10.3
1	.850	.034	.716	.318	90.7	96.0	84.7	11.3
2	.818	29.993	.691	.302	91.9	97.6	85.5	12.1
3	.794	.971	.662	.309	92.5	98.4	85.5	12.9
4	.782	.965	.646	.319	92.4	98.5	84.7	13.8
5	.780	.977	.650	.327	91.0	97.0	83.5	13.5
6	.788	.986	.654	.332	88.0	92.2	82.0	10.2
7	.807	30.003	.678	.325	84.7	88.0	80.0	8.0
8	.823	.014	.706	.303	82.6	86.0	75.3	10.7
9	.851	.028	.731	.297	81.0	85.0	74.5	10.5
10	.860	.038	.736	.302	79.9	83.6	72.8	10.7
11	.859	.037	.742	.295	79.1	82.2	72.0	10.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer,	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	75.0	3.5	72.5	6.0	0.787	8.53	1.82	0.82
1	74.7	3.2	72.5	5.4	.787	.54	.62	.84
2	74.4	3.0	72.3	5.1	.783	.49	.52	.85
3	74.2	2.7	72.3	4.6	.783	.49	.37	.86
4	74.0	2.4	72.3	4.1	.783	.51	.21	.88
5	73.7	2.2	72.2	3.7	.781	.48	.09	.89
6	73.5	2.1	72.0	3.6	.776	.43	.05	.89
7	73.5	2.0	72.1	3.4	.778	.48	0.98	.90
8	74.4	3.1	72.2	5.3	.781	.46	1.58	.84
9	75.6	4.8	72.2	8.2	.781	.41	2.53	.77
10	76.4	7.2	71.4	12.2	.761	.15	3.88	.68
11	76.0	10.6	69.6	17.0	.717	7.63	5.51	.58
Noon.	75.5	13.5	67.4	21.6	.668	.06	7.02	.50
1	74.6	16.1	64.9	25.8	.615	6.50	8.30	.44
2	74.4	17.5	63.9	28.0	.595	.27	9.05	.41
3	74.1	18.4	63.1	29.4	.580	.10	.49	.39
4	74.2	18.2	63.3	29.1	.584	.14	.40	.40
5	74.7	16.3	64.9	26.1	.615	.50	8.43	.44
6	75.7	12.3	68.3	19.7	.688	7.30	6.38	.53
7	75.8	8.9	69.6	15.1	.717	.66	4.76	.62
8	75.8	6.8	71.0	11.6	.751	8.05	3.63	.69
9	75.7	5.3	72.0	9.0	.776	.35	2.79	.75
10	75.7	4.2	72.8	7.1	.795	.59	.19	.80
11	75.5	3.6	73.0	6.1	.801	.65	1.88	.82

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	inches		lb	Miles	
1	132.7	...	SSE & NNE	2.6	133.5	Wi to 3 A. M. B to 9 P. M., Ci to 11 P. M. Brisk wind from 11½ A. M. to 4½ P. M.
2	130.2	...	SE & WSW	...	190.4	Wi to 10 A. M., Ni to 3 P. M., clouds of different kinds to 11 P. M. T & D at 6 A. M.
3	133.0	...	W by S & W	...	114.0	B to 4 A. M. S to 7 A. M. B to 1 P. M., Wi to 7 P. M. B to 11 P. M.
4	135.4	...	W & WSW	...	78.7	B to 9 P. M., Ni to 11 P. M.
5	138.0	...	W & WNW	...	122.0	B.
6	141.3	0.21	SW	0.4	103.3	B to 12 A. M., clouds of different kinds to 11 P. M. L at 7 & 8 P. M. T & R at 7 P. M.
7	138.0	...	[SSW S by W, ESE &	...	126.5	B to 4 A. M., Wi to 8 A. M. B to 2 P. M., Ci to 7 P. M. B to 11 P. M.
8	140.0	...	S by W & SSW	...	122.5	B to 3 A. M. S to 8 A. M., Ci to 4 P. M. B to 11 P. M.
9	140.5	...	SSW	...	106.4	B. Foggy from 3 to 8 A. M.
10	140.8	...	SSW & SW	...	133.2	Chiefly B. Slightly foggy at 6 & 7 A. M.
11	144.0	...	SW	...	179.9	B to 5 A. M. O to 9 A. M. B to 11 P. M.
12	145.8	...	SSW & S by W	...	185.9	B to 4 A. M. S to 8 A. M., Ni to 6 P. M. B to 11 P. M.
13	142.8	...	S by W & SW	...	135.2	Scuds from S by W to 8 A. M. B to 11 P. M. Slightly foggy at 6 & 7 A. M.
14	145.8	...	SW & WNW	...	115.2	B to 4 A. M. S to 8 A. M. B to 11 P. M.
15	144.6	...	SW & S	...	98.8	B. Foggy between 6 & 7 A. M.
16	137.0	...	SSW [WSW	...	162.9	S to 8 A. M. B to 11 P. M.
17	137.5	...	SSW, WNW &	...	105.0	B to 6 A. M. O to 9 A. M. B to 11 P. M. Slightly foggy from 5 to 7 A. M.

Wi Cirri,—i Strati, Ci Cumuli, Ci Cirro-strati, Ci Cumulo-strati, Ni Nimbi,  
Ci Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning,  
R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles	
18	140.8	...	W S W & W N W	...	105.6	B to 3 A. M. S to 6 A. M. B to 4 P. M., \i to 11 P. M. Foggy at 5 & 6 A. M.
19	136.3	...	S S W & variable	...	110.8	B to 5 A. M., \i to 9 A. M. B to 12 A. M. \i to 11 P. M.
20	137.0	...	S S W & S by W	...	75.7	S to 4 A. M., \i to 9 A. M. B to 11 P. M.
21	141.0	...	S by W & S S W	...	98.0	Chiefly B. Foggy at 6 A. M.
22	140.5	...	S S W & S E	...	87.8	B to 2 A. M. S to 7 A. M., \i to 10 A. M. B to 1 P. M., \i to 8 P. M. B to 11 P. M.
23	144.8	...	S W & W by S	...	84.3	B to 1 A. M. S to 7 A. M., \i to 7 P. M. S to 11 P. M.
24	147.0	...	S W	...	112.7	\i to 2 A. M. B to 8 P. M., \i to 11 P. M. Foggy from 5 to 7 A. M.
25	142.0	...	S & S S W	...	119.1	B.
26	144.5	...	S S W & S by W	1.3	161.0	Scuds from S S W to 4 A. M. B to 8 P. M., scuds from S by W to 11 P. M.
27	145.0	...	S S W & S W	1.3	210.2	B to 8 P. M. Scuds from S S W to 11 P. M.
28	145.0	...	S S W & S by W	...	228.5	\i to 4 A. M. B to 9 P. M., scuds from S to 11 P. M.
29	143.0	...	S by W & S S W	0.7	151.8	Chiefly B.
30	145.2	...	S S W & S by W	0.4	234.0	B to 5 A. M., scuds from S S W to 8 A. M. B to 1 P. M., \i to 4 P. M. B to 9 P. M. S to 11 P. M.
31	138.0	...	S S W & S by W	...	214.0	Scuds from S S W to 2 A. M., \i to 4 P. M. S to 7 P. M. B to 11 P. M. D at 7 P. M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning  
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of March 1872.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.845
Max. height of the Barometer occurred at 10 A. M. on the 4th. ...	30.094
Min. height of the Barometer occurred at 4 P. M. on the 29th. ...	29.646
Extreme range of the Barometer during the month ... ..	0.448
Mean of the daily Max. Pressures ... ..	29.919
Ditto ditto Min. ditto ... ..	29.773
Mean daily range of the Barometer during the month ... ..	0.146

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	°
Mean Dry Bulb Thermometer for the month ... ..	82.7
Max. Temperature occurred at 4 P. M. on the 27th. ... ..	98.5
Min. Temperature occurred at 6 & 7 A. M. on the 7th ... ..	69.5
Extreme range of the Temperature during the month ... ..	29.0
Mean of the daily Max. Temperature ... ..	92.7
Ditto ditto Min. ditto, ... ..	75.4
Mean daily range of the Temperature during the month ... ..	17.3

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Mean Wet Bulb Thermometer for the month ... ..	74.9
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	7.8
Computed Mean Dew-point for the month ... ..	69.4
Mean Dry Bulb Thermometer above computed mean Dew-point ... ..	13.3

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.713

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	Troy grain.
Mean Weight of Vapour for the month ... ..	7.66
Additional Weight of Vapour required for complete saturation ...	4.06
Mean degree of humidity for the month, complete saturation being unity	0.65

	°
Mean Max. Solar radiation Thermometer for the month ... ..	140.6

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	Inches.
Rained 3 days,—Max. fall of rain during 24 hours ... ..	0.21
Total amount of rain during the month ... ..	0.21
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... ..	0.16
Prevailing direction of the Wind ... .. S. S. W, S. W. & S. by W.	

\* Height 70 feet 10 inches above ground.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1872.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.886	30.030	29.825	0.205	78.8	83.5	71.5	12.0
2	.847	29.931	.775	.156	82.0	90.5	76.0	14.5
3	.849	.928	.763	.165	82.2	92.6	75.5	17.1
4	.844	.915	.765	.150	81.2	88.7	76.7	12.0
5	.894	.956	.834	.122	81.0	90.7	71.6	19.1
6	.939	30.020	.866	.154	84.1	92.2	78.0	14.2
7	.882	29.957	.803	.154	85.0	94.7	77.0	17.7
8	.813	.902	.734	.168	86.1	96.0	76.4	19.6
9	.767	.834	.703	.131	87.2	98.3	75.5	19.8
10	.742	.809	.675	.134	88.1	100.5	78.5	22.0
11	.736	.796	.687	.109	84.8	90.0	81.0	9.0
12	.730	.794	.666	.128	85.6	95.0	78.5	16.5
13	.746	.804	.677	.127	86.6	97.3	78.2	19.1
14	.779	.843	.735	.108	87.8	99.0	80.0	19.0
15	.782	.859	.718	.141	88.2	98.7	80.6	18.1
16	.778	.835	.716	.119	87.6	98.0	78.7	19.3
17	.791	.866	.678	.188	86.3	96.1	77.5	18.6
18	.815	.887	.737	.150	82.4	91.8	73.0	18.8
19	.745	.819	.641	.178	86.4	95.8	78.4	17.4
20	.698	.764	.626	.138	87.6	100.0	80.8	19.2
21	.686	.771	.605	.166	88.3	99.0	80.0	19.0
22	.674	.738	.573	.165	88.0	98.0	82.0	16.0
23	.680	.741	.567	.174	86.1	97.2	80.0	17.2
24	.682	.738	.592	.146	83.8	94.0	77.3	16.7
25	.635	.698	.519	.179	86.6	94.9	79.8	15.1
26	.612	.676	.557	.119	86.9	92.8	81.9	10.9
27	.679	.748	.622	.126	88.1	95.4	83.8	11.6
28	.703	.764	.618	.146	88.7	98.2	84.3	13.9
29	.689	.762	.613	.149	86.6	94.3	75.5	18.8
30	.703	.754	.626	.128	85.1	92.7	76.8	15.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1872.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	74.5	4.3	71.5	7.3	0.763	8.26	2.18	0.79
2	73.7	8.3	67.9	14.1	.679	7.30	4.17	.64
3	76.7	6.6	72.8	9.4	.795	8.55	2.99	.74
4	76.5	4.7	73.2	8.0	.806	.68	.53	.77
5	74.4	6.6	69.8	11.2	.722	7.78	3.36	.70
6	76.2	7.9	70.7	13.4	.744	.97	4.24	.65
7	75.9	9.1	69.5	15.5	.715	.63	.90	.61
8	75.3	10.8	67.7	18.4	.674	.19	5.76	.56
9	77.6	9.6	71.8	15.4	.771	8.20	.17	.61
10	77.3	10.8	70.8	17.3	.746	7.92	.80	.58
11	74.6	10.2	67.6	17.3	.670	.17	.29	.58
12	79.0	6.6	74.4	11.2	.838	8.95	3.81	.70
13	78.3	8.3	73.3	13.3	.809	.61	4.53	.66
14	79.1	8.7	73.9	13.9	.824	.76	.84	.64
15	78.5	9.7	72.7	15.5	.792	.40	5.36	.61
16	77.8	9.8	71.9	15.7	.773	.21	.31	.61
17	74.2	12.1	65.7	20.6	.632	6.73	6.29	.52
18	73.1	9.3	66.6	15.8	.651	.98	4.63	.60
19	75.9	10.5	68.5	17.9	.692	7.37	5.69	.56
20	78.8	8.8	73.5	14.1	.814	8.65	4.87	.64
21	80.1	8.2	75.2	13.1	.860	9.13	.67	.66
22	81.2	6.8	77.1	10.9	.913	.70	3.98	.71
23	79.6	6.5	75.0	11.1	.854	.11	.84	.70
24	78.4	5.4	74.6	9.2	.843	.03	.07	.75
25	81.2	5.4	78.0	8.6	.940	10.01	.13	.76
26	81.5	5.4	78.3	8.6	.949	.09	.16	.76
27	81.6	6.5	77.7	10.4	.931	9.90	.82	.72
28	81.5	7.2	77.2	11.5	.916	.71	4.25	.70
29	79.8	6.8	75.7	10.9	.873	.30	3.84	.71
30	78.9	6.2	74.6	10.5	.843	.00	.57	.72

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid- night.	29.775	29.947	29.622	0.325	81.1	84.5	76.2	8.3
1	.764	.942	.613	.329	80.7	84.5	76.0	8.5
2	.754	.935	.606	.329	80.3	84.4	75.0	9.4
3	.744	.929	.594	.335	80.0	84.4	74.0	10.4
4	.740	.923	.585	.338	79.7	84.5	73.0	11.5
5	.753	.932	.592	.340	79.3	84.3	72.0	12.3
6	.768	.943	.604	.339	79.2	84.5	71.6	12.9
7	.791	.999	.625	.374	79.3	85.0	71.5	13.5
8	.812	30.003	.657	.346	82.4	86.5	73.8	12.7
9	.825	.020	.673	.347	85.7	89.0	75.7	13.3
10	.828	.030	.676	.354	88.3	92.4	76.0	16.4
11	.818	.014	.664	.350	90.5	95.5	76.8	18.7
Noon.	.800	29.990	.654	.336	92.0	96.7	78.0	18.7
1	.771	.962	.623	.339	93.4	98.8	78.6	20.2
2	.741	.927	.591	.336	94.1	100.0	79.0	21.0
3	.711	.903	.565	.338	94.2	100.5	81.5	19.0
4	.694	.874	.519	.355	93.1	99.4	83.0	16.4
5	.689	.866	.532	.334	91.6	98.0	82.6	15.4
6	.695	.875	.543	.332	89.2	94.7	81.6	13.1
7	.715	.893	.571	.322	86.3	91.0	78.9	12.1
8	.740	.903	.592	.311	84.8	89.0	78.0	11.0
9	.764	.922	.609	.313	83.7	86.5	77.3	9.2
10	.778	.952	.642	.310	82.3	85.5	75.5	10.0
11	.776	.956	.625	.331	81.7	85.0	76.2	8.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid. night.	77.1	4.0	74.3	6.8	0.835	8.90	2.18	0.81
1	77.0	3.7	74.4	6.3	.838	9.04	.00	.82
2	76.9	3.4	74.5	5.8	.840	.07	1.84	.83
3	76.9	3.1	74.7	5.3	.846	.14	.67	.85
4	76.9	2.8	74.9	4.8	.851	.19	.53	.86
5	76.7	2.6	74.9	4.4	.851	.21	.38	.87
6	76.6	2.6	74.8	4.4	.849	.19	.37	.87
7	76.9	2.9	74.9	4.0	.851	.19	.56	.86
8	77.7	4.7	74.4	8.0	.838	.00	2.61	.78
9	78.0	7.7	72.6	13.1	.790	8.43	4.87	.66
10	78.3	10.0	72.3	16.0	.783	.31	5.49	.60
11	78.7	11.8	71.6	18.9	.766	.08	6.64	.55
Noon.	78.9	13.1	71.0	21.0	.751	7.90	7.46	.51
1	78.9	14.5	70.2	23.2	.732	.68	8.31	.48
2	79.2	14.9	70.3	23.8	.734	.69	.63	.47
3	79.3	14.9	70.4	23.8	.736	.71	.65	.47
4	78.5	14.6	69.7	23.4	.720	.57	.29	.48
5	77.6	14.0	69.2	22.4	.708	.47	7.72	.40
6	77.5	11.7	70.5	18.7	.739	.82	6.34	.55
7	77.5	8.8	71.3	15.0	.758	8.08	4.94	.62
8	77.3	7.5	72.0	12.8	.776	.28	.18	.67
9	77.5	6.2	73.2	10.5	.806	.63	3.44	.72
10	77.3	5.0	73.8	8.5	.822	.82	2.76	.76
11	77.3	4.4	74.2	7.5	.832	.94	.43	.79

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches		lb	Miles	
1	121.5	0.39	S by E & variable	12.0	140.3	B to 4 A. M. S to 2 P. M., $\searrow$ i to 7 P. M. B to 11 P. M. Strong wind from 6½ to 7½ A. M. T L & R between 6 & 7 A. M. D at 10 A. M.
2	142.4	...	S S W & W N W	...	81.2	B to 2 A. M., $\searrow$ i to 1 P. M. B to 8 P. M. S to 11 P. M.
3	145.8	0.02	W S W & S S W	...	68.4	S to 5 A. M., $\searrow$ i to 6 P. M. B to 11 P. M. T at 4 P. M. L on N E at 7 P. M. Light R between 3 & 4 P. M.
4	134.5	0.34	S by W & S S W	10.0	128.7	Clouds of different kinds. Strong wind & R at 2½ P. M. T & L at 2, 8, 9 & 11 P. M. D at 10½ P. M.
5	146.0	...	Variable	...	159.0	$\searrow$ i to 5 A. M., $\searrow$ i to 11 A. M., $\searrow$ i to 8 P. M. O to 11 P. M. L from 7½ to 10 P. M.
6	147.7	...	W S W & S S E	...	80.2	S to 5 A. M., $\searrow$ i to 10 A. M., $\searrow$ i & $\searrow$ i to 6 P. M. B to 11 P. M.
7	145.9	...	S & S by W	...	21.1	B to 11 A. M., $\searrow$ i to 6 P. M. B to 11 P. M.
8	146.0	...	W, W by N & S S W	...	26.6	B to 5 A. M., $\searrow$ i to 8 A. M. B to 1 P. M., $\searrow$ i to 4 P. M. B to 11 P. M.
9	148.0	...	S S W, S W & S by W	0.4	75.2	Chiefly B.
10	147.2	...	S by W & S S W	0.8	119.9	B to 2 P. M., $\searrow$ i to 11 P. M.
11	124.0	...	S S W & S E	...	173.1	$\searrow$ i to 2 A. M. S to 6 A. M., $\searrow$ i to 10 A. M. S to 2 P. M., $\searrow$ i to 8 P. M., $\searrow$ i to 11 P. M. D between 10 & 11 A. M.
12	142.8	...	S, S S W & S by W	...	99.7	$\searrow$ i to 6 P. M. B to 11 P. M. L on W between 7 & 8 P. M. D at 11 A. M.
13	149.0	...	S by W & S S W	0.4	140.5	B to 4 P. M., clouds of different kinds to 11 P. M. T & L at 6½ P. M. D at 7½ P. M.
14	146.0	...	S & S by W	...	153.7	$\searrow$ i to 3 A. M. S to 7 A. M. $\searrow$ i to 11 P. M.
15	145.5	...	S by W & S	...	133.1	$\searrow$ i to 1 A. M. B to 5 A. M., $\searrow$ i to 7 P. M. B to 11 P. M.

$\searrow$  i Cirri, — i Strati,  $\searrow$  i Cumuli,  $\searrow$  i Cirro-strati,  $\searrow$  i Cumulo-strati,  $\searrow$  i Nimbi,  $\searrow$  i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning, R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1872.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles	
16	143.4	...	S & N	...	135.3	B to 6 A.M., \i to 2 P.M. B to 5 P.M., \i to 9 P.M. S to 11 P.M.
17	140.0	...	Variable	4.0	121.5	Chiefly \i. High wind from 9½ to 10 P.M. L on S between 10½ to 11 P.M.
18	141.0	0.02	W & W N W	...	99.1	O to 2 A.M., \i & \i to 1 P.M., \i to 5 P.M. B to 11 P.M. T, L & Slight R at midnight.
19	142.0	...	S S W & S W	0.7	124.9	\i to 3 A.M. B to 11 P.M.
20	143.8	...	S S W	...	208.2	B to 2 A.M., \i & \i to 7 A.M. B to 12 A.M., clouds of different kinds to 11 P.M.
21	146.5	...	S S W & S by W	...	228.3	B to 6 A.M., \i to 10 A.M. B to 2 P.M., clouds of different kinds to 11 P.M.
22	145.0	...	S by W & S S W	1.0	238.0	B to 6 A.M., \i to 11 P.M. L between 8 & 9 & 10 & 11 P.M.
23	144.5	0.05	S & S S W	11.2	315.8	Chiefly \i. Strong wind between 3½ to 3¾ P.M. T from 2½ to 5½ P.M. Light R at 3½, 4½ & 6½ P.M.
24	141.0	0.28	S E & S S W	...	238.3	Clouds of different kinds. T & Slight R between 4 & 5 P.M.
25	141.3	...	S & S by W	1.2	205.1	B to 5 A.M., clouds of different kinds to 11 P.M. L on NE at 7 & 8 P.M.
26	139.0	...	S & S by W	2.4	351.5	Chiefly B.
27	141.8	...	S by W, S S W & S	1.0	366.9	Seuds from S by W to 9 A.M., B to 11 P.M.
28	142.4	...	S & S by W	1.3	301.1	Seuds from S & S by W to 9 A.M. \i to 7 P.M., S to 11 P.M. L from 7½ to 10 P.M.
29	144.0	0.73	S by W & S	1.9	208.3	S to 7 A.M., \i to 11 P.M. L from 8 to 11 P.M. T at 8½ & 10 P.M. R at 10 P.M.
30	140.2	...	S S W & S by W	1.3	267.7	\i to 12 A.M., \i to 7 P.M. B to 11 P.M. L at 8 & between 10 & 11 P.M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of April 1872.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.760
Max. height of the Barometer occurred at 10 A. M. on the 1st. ...	30.030
Min. height of the Barometer occurred at 4 P. M. on the 25th. ...	29.519
<i>Extreme range</i> of the Barometer during the month ... ..	0.511
Mean of the daily Max. Pressures ... ..	29.831
Ditto ditto Min. ditto ... ..	29.684
<i>Mean daily range</i> of the Barometer during the month ... ..	0.147

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	°
Mean Dry Bulb Thermometer for the month ... ..	85.6
Max. Temperature occurred at 3 P. M. on the 10th. ... ..	100.5
Min. Temperature occurred at 7 A. M. on the 1st ... ..	71.5
<i>Extreme range</i> of the Temperature during the month ... ..	29.0
Mean of the daily Max. Temperature ... ..	94.9
Ditto ditto Min. ditto, ... ..	78.3
<i>Mean daily range</i> of the Temperature during the month ... ..	16.6

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Mean Wet Bulb Thermometer for the month ... ..	77.7
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	7.9
Computed Mean Dew-point for the month ... ..	72.2
Mean Dry Bulb Thermometer above computed mean Dew-point ... ..	13.4

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.781

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	Troy grain.
Mean Weight of Vapour for the month ... ..	8.33
Additional Weight of Vapour required for complete saturation ...	4.43
Mean degree of humidity for the month, complete saturation being unity	0.65

	°
Mean Max. Solar radiation Thermometer for the month ... ..	142.3

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	Inches.
Rained 10 days,—Max. fall of rain during 24 hours ... ..	0.73
Total amount of rain during the month ... ..	1.83
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... ..	1.36
Prevailing direction of the Wind ... .. S. S. W, S. by W. & S.	

\* Height 70 feet 10 inches above ground.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1872.*

Latitude  $22^{\circ} 33' 1''$  North. Longitude  $88^{\circ} 20' 34''$  East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at $32^{\circ}$ Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.751	29.810	29.680	0.130	86.8	95.0	81.0	14.0
2	.755	.812	.673	.139	86.4	95.0	79.5	15.5
3	.764	.825	.688	.137	86.9	95.8	80.4	15.4
4	.767	.854	.685	.169	87.6	95.4	82.0	13.4
5	.700	.783	.605	.178	88.0	96.5	82.2	14.3
6	.630	.688	.531	.157	87.6	95.3	82.3	13.0
7	.591	.651	.476	.175	87.7	96.3	79.5	16.8
8	.573	.630	.476	.154	86.5	94.7	78.0	16.7
9	.561	.621	.490	.131	85.2	95.5	78.2	17.3
10	.544	.610	.488	.122	80.5	87.0	74.8	12.2
11	.617	.717	.556	.161	82.1	90.2	75.0	15.2
12	.691	.783	.613	.170	86.6	96.0	79.5	16.5
13	.779	.862	.695	.167	86.8	96.7	78.5	18.2
14	.755	.850	.651	.199	87.2	97.8	78.5	19.3
15	.676	.724	.571	.153	88.2	96.0	81.0	15.0
16	.649	.705	.583	.122	87.4	96.5	80.5	16.0
17	.648	.728	.595	.133	83.9	92.1	77.6	14.5
18	.691	.756	.627	.129	82.1	90.2	76.0	14.2
19	.674	.732	.619	.113	85.3	94.0	76.5	17.5
20	.688	.785	.580	.205	85.6	98.4	76.4	22.0
21	.670	.742	.582	.160	84.2	92.2	76.5	15.7
22	.645	.701	.586	.115	84.8	96.4	79.0	17.4
23	.631	.690	.564	.126	87.8	98.3	78.8	19.5
24	.641	.730	.566	.164	87.7	97.8	77.7	20.1
25	.643	.707	.561	.146	86.8	95.4	79.6	15.8
26	.562	.611	.494	.117	89.5	98.0	83.0	15.0
27	.547	.598	.483	.115	90.6	101.3	83.4	17.9
28	.578	.636	.512	.124	90.9	100.2	84.7	15.5
29	.633	.697	.571	.126	89.9	99.0	84.5	14.5
30	.640	.699	.577	.122	90.1	98.6	84.2	14.4
31	.619	.674	.546	.128	90.0	99.5	83.4	16.1

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta;  
in the month of May 1872.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	79.9	6.9	75.8	11.0	.0876	9.33	3.88	0.71
2	79.9	6.5	75.3	11.1	.862	.19	.87	.70
3	80.3	6.6	76.3	10.6	.890	.48	.77	.72
4	80.6	7.1	76.2	11.4	.887	.45	4.07	.70
5	80.8	7.2	76.5	11.5	.896	.52	.16	.70
6	81.2	6.4	77.4	10.2	.922	.81	3.71	.73
7	81.2	6.5	77.3	10.4	.919	.78	.78	.72
8	80.3	6.2	76.6	9.9	.899	.57	.53	.73
9	79.9	5.3	76.2	9.0	.887	.49	.12	.75
10	77.5	3.0	75.4	5.1	.865	.34	1.64	.85
11	78.2	3.9	75.5	6.6	.868	.33	2.18	.81
12	80.5	6.1	76.8	9.8	.905	.63	3.51	.73
13	79.8	7.0	75.6	11.2	.871	.27	.94	.70
14	79.8	7.4	75.4	11.8	.865	.20	4.17	.69
15	80.6	7.6	76.0	12.2	.882	.37	.39	.68
16	80.5	6.9	76.4	11.0	.893	.51	3.94	.71
17	77.7	6.2	73.4	10.5	.811	8.67	.46	.72
18	75.8	6.3	71.4	10.7	.761	.17	.34	.71
19	80.0	5.3	76.3	9.0	.890	9.52	.12	.75
20	78.1	7.5	72.8	12.8	.795	8.48	4.28	.67
21	77.4	6.8	72.6	11.6	.790	.45	3.79	.69
22	79.1	5.7	75.1	9.7	.867	9.15	.31	.73
23	80.3	7.5	75.8	12.0	.876	.31	4.29	.69
24	81.1	6.6	77.1	10.6	.913	.70	3.86	.72
25	81.3	5.5	78.0	8.8	.940	10.01	.20	.76
26	83.2	6.3	79.4	10.1	.983	.41	.83	.73
27	84.0	6.6	80.0	10.6	1.001	.57	4.19	.72
28	83.9	7.0	79.7	11.2	0.992	.43	.41	.70
29	82.9	7.0	78.7	11.2	.961	.18	.28	.70
30	82.4	7.7	77.8	12.3	.934	9.89	.65	.68
31	81.6	8.4	76.6	13.4	.899	.52	.98	.66

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.666	29.850	29.565	0.285	82.3	86.7	77.0	9.7
1	.658	.833	.546	.287	81.9	86.2	76.5	9.7
2	.648	.820	.544	.276	81.6	86.0	76.0	10.0
3	.639	.814	.532	.282	81.4	85.8	75.5	10.3
4	.638	.803	.521	.282	81.2	85.5	75.5	10.0
5	.651	.807	.531	.276	81.0	85.0	75.3	9.7
6	.667	.796	.539	.257	81.0	84.7	75.0	9.7
7	.686	.814	.555	.259	82.4	86.0	76.5	9.5
8	.701	.845	.557	.288	85.1	88.8	79.5	9.3
9	.709	.854	.555	.299	87.5	91.4	79.2	12.2
10	.709	.844	.591	.253	89.5	93.6	75.5	18.1
11	.699	.833	.563	.270	91.4	96.2	74.8	21.4
Noon.	.693	.825	.525	.300	93.2	97.8	78.4	19.4
1	.662	.817	.532	.285	94.3	99.2	82.0	17.2
2	.635	.778	.514	.264	95.1	100.0	82.5	17.5
3	.611	.757	.507	.250	95.0	101.3	83.9	17.4
4	.590	.741	.476	.265	93.9	99.7	80.5	19.2
5	.586	.734	.480	.254	92.4	97.0	81.6	15.4
6	.597	.739	.476	.263	89.7	95.0	79.0	16.0
7	.618	.751	.501	.250	87.3	92.2	79.5	12.7
8	.649	.786	.526	.260	85.3	90.2	76.0	14.2
9	.670	.828	.548	.280	83.9	89.5	76.4	12.1
10	.679	.852	.566	.286	83.5	87.9	76.8	11.1
11	.672	.862	.573	.289	82.9	87.0	77.0	10.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- moneter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	78.8	3.5	76.3	6.0	0.890	9.57	2.01	0.83
1	78.7	3.2	76.5	5.4	.896	.65	1.79	.84
2	78.7	2.9	76.7	4.9	.902	.70	.64	.86
3	78.5	2.9	76.5	4.9	.896	.65	.62	.86
4	78.5	2.7	76.6	4.6	.899	.67	.54	.86
5	78.5	2.5	76.7	4.3	.902	.72	.42	.87
6	78.9	2.1	77.4	3.6	.922	.93	.21	.89
7	79.8	2.6	78.0	4.4	.940	10.11	.50	.87
8	81.0	4.1	78.1	7.0	.943	.08	2.49	.80
9	81.7	5.8	78.2	9.3	.946	.07	3.42	.75
10	81.8	7.7	77.2	12.3	.916	9.71	4.58	.68
11	82.2	9.2	76.7	14.7	.902	.51	5.59	.63
Noon.	82.4	10.8	75.9	17.3	.879	.24	6.66	.59
1	82.5	11.8	75.4	18.9	.865	.07	7.34	.55
2	82.2	12.9	74.5	20.6	.840	8.79	8.00	.52
3	82.1	12.9	74.4	20.6	.833	.77	7.97	.52
4	81.9	12.0	74.7	19.2	.846	.83	.34	.55
5	81.8	10.6	75.4	17.0	.865	9.11	6.43	.59
6	81.9	8.8	75.6	14.1	.871	.21	5.16	.64
7	80.1	7.2	75.8	11.5	.876	.31	4.10	.69
8	79.5	5.8	75.4	9.9	.865	.24	3.40	.73
9	79.1	4.8	75.7	8.2	.873	.36	2.77	.77
10	79.1	4.4	76.0	7.5	.882	.45	.55	.79
11	79.0	3.9	76.3	6.6	.890	.55	.24	.81

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles	
1	146.8	...	S by W, SSW & S	0.9	277.9	B. to 2 A. M. ~i to 4 P. M. ~i to 8 P. M. S to 11 P. M. Brisk wind from 10 A. M. to 8 P. M.
2	144.5	...	S <sup>w</sup> & S by W	...	207.8	~i & ~i to 7 A. M. ~i to 6 P. M. B to 11 P. M. L on N. W. at 8 P. M.
3	140.5	...	S by W & S	0.8	140.6	B to 2 A. M. ~i to 7 A. M. ~i to 5 P. M., clouds of different kinds to 11 P. M. Brisk wind from 2 to 5½ P. M. L from 7½ to 9 P. M.
4	149.0	...	S, SSW & S by W	0.5	195.9	~i to 2 P. M. B to 11 P. M. Brisk wind from 9 A. M., to 5 P. M.
5	142.0	...	S by W & S S W	1.9	252.1	B to 3 A. M. ~i to 6 A. M. ~i to 9 A. M. ~i to 3 P. M. S, to 11 P. M. Brisk wind from 8 A. M. to 6½ P. M.
6	141.0	...	S & S by W	2.0	312.2	S to 1 A. M. B to 4 A. M. Scuds to 11 A. M. ~i & ~i to 5 P. M. O to 11 P. M. Brisk wind from 8 A. M. to 7 P. M. T from 5½ to 7 P. M. L on E from 7 to 9 P. M. D at 6½ P. M.
7	143.8	...	S & S by W	2.7	338.8	S to 2 A. M. Scuds to 1 P. M. B to 6 P. M. S to 11 P. M. Strong wind nearly the whole day. L at 2 & 3 A. M. & from 7 to 10 P. M. D at 8½ P. M.
8	140.7	...	SSE, S by W & S	0.5	406.7	B. to 6 A. M. Scuds to 10 A. M. ~i to 3 P. M. S to 11 P. M. Brisk wind from 4 to 10½ A. M. T from 5½ to 7 P. M. L from 6 to 8 P. M. D at 6 & 7 P. M.
9	141.5	...	E by S & E	...	102.8	S to 6 A. M. ~i to 3 P. M. S to 7 P. M., B to 11 P. M. T between 2¼ & 3 P. M.

~i Cirri,—i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,  
~i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning,  
R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1872.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		h.	Miles	
10	122.2	0.58	E.	9.3	103.5	B to 5 A. M. S to 9 A. M. O to 3 P. M. \i to 7 P. M. B to 11 P. M. Strong wind from 9½ to 9¾ A. M. T & R from 9½ to 11 A. M. & at 3 P. M.
11	136.2	...	SE & variable.	2.0	115.7	B to 5 A. M. S to 8 A. M. \i to 4 P. M. S to 11 P. M. Brisk wind from 8½ to 8¾ A. M. L from 8 to 11 P. M.
12	141.5	...	ESE & SSW	3.6	69.0	B to 6 A. M. \i to 9 A. M. \i to 1 P. M. B to 4 P. M. Scuds to 7 P. M. O to 11 P. M. Brisk wind & Light R at 8½ P. M. L at midnight & from 8 to 10 P. M.
13	148.0	...	SW & SSW	0.8	167.2	Chiefly \i L from S to 10 P. M.
14	149.0	...	SSW & S by W	0.8	174.3	O to 9 A. M. \i to 2 P. M. B to 11 P. M. L at midnight. 1 & 3 A. M.
15	143.6	...	SSW & S by W	1.3	268.1	B to 8 A. M. \i to 9 P. M. O to 11 P. M. Brisk wind at 2½ P. M. L from 7½ to 11 P. M. T from 8½ to 11 P. M. D at 7½ P. M.
16	141.8	0.08	SSW & S	1.4	290.5	O to 2 A. M. \i to 12 A. M. \i to 3 P. M. \i & S to 11 P. M. Brisk wind from 10½ A. M. to 4½ P. M. TL & Slight R at midnight & 1 A. M.
17	144.0	...	Variable.	2.0	251.9	\i to 4 A. M. \i to 8 A. M. \i to 3 P. M. O to 11 P. M. Brisk wind from 11½ to 12 A. M. T from 3 to 5 P. M. L from 8½ to 11 P. M. D at 4 & 10½ P. M.
18	128.0	0.58	[S W WNW, SSW &	11.8	179.0	\i to 2 A. M. \i to 8 A. M. O to 2 P. M. \i to 6 P. M. O to 11 P. M. Strong wind & L. & R. from 7½ to 8½ P. M. T at 8 P. M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1872.*

Solar Radiation, Weather, &c..

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	<sup>0</sup>	Inches		lb	Miles.	
19	142.3	...	S W & S S W	0.3	174.0	S to 2 A. M. B to 8 A. M. $\curvearrowright$ i to 8 P. M. O to 11 P. M. L from 7½ to 10 P. M.
20	144.0	0.59	W, S & N W	4.4	184.0	B to 1 P. M. $\curvearrowright$ i to 5 P. M. O to 11 P. M. High wind from 8½ to 8¾ P. M. T & L from 5½ to 9 P. M. Slight R from 6 to 10½ P. M.
21	137.5	...	Variable.	3.6	189.1	O to 5 A. M. $\curvearrowright$ i to 11 A. M. $\curvearrowright$ i to 8 P. M. B to 11 P. M. High wind at 2½ A. M.
22	148.0	0.12	W S W & S W	2.1	104.3	B to 10 A. M. $\curvearrowright$ i to 3 P. M. O to 7 P. M. B to 11 P. M. Brisk wind from 4 to 4½ P. M. T at 4 P. M. Slight R at 4 & 6½ P. M.
23	142.5	...	S & S S W	...	143.7	B to 11 A. M. $\curvearrowright$ i to 4 P. M. B to 8 P. M. $\curvearrowright$ i to 11 P. M.
24	144.9	0.04	S & S by W	5.8	177.2	$\curvearrowright$ i to 1 A. M. B 12 A. M. $\curvearrowright$ i 6 P. M. O to 11 P. M. High wind from 8¾ to 9½ P. M. L from 8 to 10 P. M. T & Slight R at 9 & 10 P. M.
25	143.0	...	S & S by E	...	193.0	S to 4 A. M. $\curvearrowright$ i to 8 A. M. $\curvearrowright$ i to 5 P. M. $\curvearrowright$ i to 7 P. M. B to 11 P. M. L on S W at 8 P. M.
26	143.5	...	S S E, S & S by E	...	201.4	B to 1 P. M. $\curvearrowright$ i to 7 P. M. B to 11 P. M.
27	147.0	...	S by E & S	...	184.4	$\curvearrowright$ i to 6 A. M. B to 11 A. M. $\curvearrowright$ i to 3 P. M. $\curvearrowright$ i to 11 P. M.
28	145.0	...	S & S S W	0.2	196.5	B to 5 A. M. $\curvearrowright$ i & $\curvearrowright$ i to 11 P. M. D at 5½ P. M.
29	143.0	...	S by W & S	...	203.8	B to 10 A. M. $\curvearrowright$ i to 7 P. M. B to 11 P. M.
30	143.5	...	S & S by W	0.8	182.2	Chiefly B.
31	144.2	...	S & S by E	0.8	291.2	Chiefly B.

$\curvearrowright$  i Cirri — i Strati,  $\curvearrowright$  i Cumuli,  $\curvearrowright$  i Cirro-strati,  $\curvearrowright$  i Cumulo-strati  $\curvearrowright$  i Nimbi,  
 $\curvearrowright$  i Cirro-Cumuli, B clear, S straton, O overcast, T thunder, L lightning,  
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of May 1872.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.655
Max. height of the Barometer occurred at 11 p. m. on the 13th. ...	29.862
Min. height of the Barometer occurred at 4 & 6 p. m. on the 7th & 8th	29.476
Extreme range of the Barometer during the month ... ..	0.386
Mean of the daily Max. Pressures ... ..	29.723
Ditto ditto Min. ditto ... ..	29.578
Mean daily range of the Barometer during the month ... ..	0.145

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	°
Mean Dry Bulb Thermometer for the month ... ..	86.8
Max. Temperature occurred at 3 p. m. on the 27th. ... ..	101.3
Min. Temperature occurred at 11 a. m. on the 10th ... ..	74.8
Extreme range of the Temperature during the month ... ..	26.5
Mean of the daily Max. Temperature ... ..	95.8
Ditto ditto Min. ditto, ... ..	79.7
Mean daily range of the Temperature during the month ... ..	16.1

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Mean Wet Bulb Thermometer for the month ... ..	80.3
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer	6.5
Computed Mean Dew-point for the month ... ..	76.4
Mean Dry Bulb Thermometer above computed mean Dew-point ...	10.4

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.893

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	Troy grain.
Mean Weight of Vapour for the month ... ..	9.53
Additional Weight of Vapour required for complete saturation ...	3.68
Mean degree of humidity for the month, complete saturation being unity	0.72

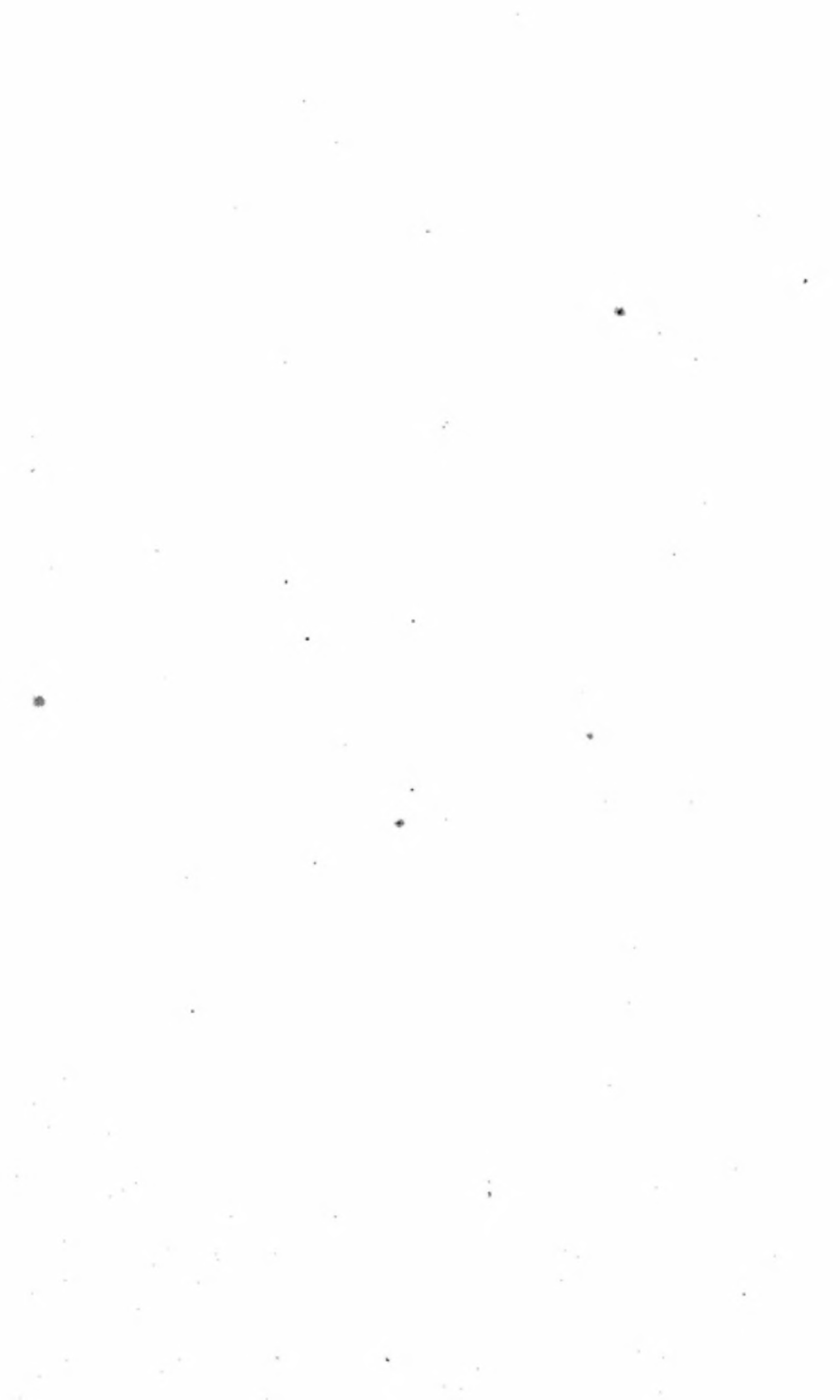
	°
Mean Max. Solar radiation Thermometer for the month ... ..	142.6

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	Inches.
Rained 14 days,—Max. fall of rain during 24 hours ... ..	0.59
Total amount of rain during the month ... ..	1.99
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... ..	1.54
Prevailing direction of the Wind ... .. S, S. by W. & S. S. W.	

\* Height 70 feet 10 inches above ground.





*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1872.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.639	29.681	29.584	0.097	80.5	98.2	82.0	15.2
2	.621	.681	.563	.118	88.7	96.0	83.2	12.8
3	.626	.695	.554	.141	88.9	96.3	83.0	13.3
4	.613	.708	.594	.114	89.3	95.7	84.0	11.7
5	.650	.708	.556	.152	87.4	95.4	76.3	19.1
6	.656	.705	.589	.116	86.6	94.8	77.2	17.6
7	.664	.705	.622	.083	87.8	94.6	82.5	12.1
8	.670	.729	.574	.155	87.8	95.5	79.5	16.0
9	.684	.764	.611	.153	85.0	90.2	80.0	10.2
10	.679	.740	.599	.141	86.1	91.9	80.0	11.9
11	.602	.664	.529	.135	84.1	92.8	77.1	15.2
12	.573	.625	.511	.114	81.8	85.5	77.5	8.0
13	.591	.616	.549	.067	83.3	91.0	79.0	12.0
14	.686	.738	.630	.108	80.0	84.9	76.5	8.4
15	.743	.799	.678	.121	83.3	89.5	77.5	12.0
16	.748	.795	.661	.134	85.8	91.5	81.2	10.3
17	.666	.735	.591	.144	86.7	92.6	81.8	10.8
18	.607	.670	.533	.137	85.3	92.6	78.0	14.5
19	.606	.663	.553	.110	86.6	93.2	79.0	14.2
20	.612	.670	.514	.156	87.9	95.0	82.0	13.0
21	.579	.667	.522	.145	84.5	89.0	80.8	8.2
22	.592	.559	.441	.118	82.8	84.0	80.5	5.5
23	.453	.507	.378	.129	83.8	84.0	80.8	8.2
24	.388	.413	.306	.137	84.9	90.8	81.0	9.8
25	.329	.361	.251	.110	83.5	90.2	81.9	8.3
26	.287	.331	.231	.100	83.8	88.8	81.0	7.8
27	.259	.304	.206	.098	81.2	89.0	80.8	8.2
28	.319	.369	.281	.088	82.1	86.0	79.7	6.3
29	.359	.412	.312	.100	89.7	84.9	79.0	5.0
30	.344	.397	.274	.123	81.8	85.0	79.6	5.4

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1872.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	81.8	7.7	77.2	12.3	0.916	9.71	4.58	0.68
2	80.9	7.8	76.2	12.5	.887	.41	.55	.67
3	81.3	7.6	76.7	12.2	.902	.56	.48	.68
4	82.2	7.1	77.9	11.4	.937	.94	.27	.70
5	80.8	6.6	76.8	10.6	.905	.61	3.84	.71
6	81.0	5.6	77.6	9.0	.928	.80	.25	.75
7	80.8	7.0	76.6	11.2	.899	.56	4.04	.70
8	80.0	7.8	75.3	12.5	.862	.16	.44	.67
9	81.1	3.9	78.4	6.6	.952	10.17	2.36	.81
10	81.0	5.1	77.4	8.7	.922	9.83	3.12	.76
11	80.3	3.8	77.6	6.5	.928	.93	2.28	.81
12	79.3	2.5	77.5	4.3	.925	.96	1.44	.87
13	79.9	3.4	77.5	5.8	.925	.92	2.01	.83
14	78.5	1.5	77.4	2.6	.922	.95	0.86	.92
15	80.3	3.0	78.2	5.1	.946	10.15	1.78	.85
16	81.9	3.9	79.2	6.6	.976	.41	2.42	.81
17	82.0	4.7	79.2	7.5	.976	.39	.79	.79
18	81.3	4.0	78.5	6.8	.955	.21	.43	.81
19	81.4	5.2	78.3	8.3	.949	.12	3.02	.77
20	81.9	6.0	78.3	9.6	.919	.07	.57	.74
21	81.6	2.9	79.6	4.0	.989	.58	1.77	.86
22	81.0	1.8	79.7	3.1	.992	.66	.09	.91
23	81.4	2.4	79.7	4.1	.992	.63	.47	.88
24	81.8	3.1	79.6	5.3	.989	.58	.91	.85
25	81.9	1.6	80.8	2.7	1.027	11.00	.00	.92
26	81.8	2.0	80.4	3.4	.014	10.87	.23	.90
27	81.5	2.7	79.6	4.6	0.989	.58	.66	.86
28	80.0	2.1	78.5	3.6	.955	.27	.24	.89
29	79.2	1.5	78.1	2.6	.943	.16	0.88	.92
30	79.7	2.1	78.2	3.6	.946	.17	1.23	.89

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.580	29.783	29.284	0.499	82.2	85.7	77.2	8.5
1	.568	.770	.261	.509	82.1	85.7	77.8	7.9
2	.556	.759	.238	.521	82.0	85.5	78.0	7.5
3	.548	.744	.250	.494	81.8	85.2	77.5	7.7
4	.542	.727	.229	.498	81.7	85.0	77.5	7.5
5	.552	.742	.241	.501	81.6	85.0	77.3	7.7
6	.567	.748	.249	.499	81.7	85.5	77.0	8.5
7	.583	.759	.269	.490	82.8	86.5	77.0	9.5
8	.594	.778	.279	.499	84.5	88.5	76.5	12.0
9	.604	.795	.281	.514	86.6	91.0	77.3	13.7
10	.603	.795	.281	.514	87.9	93.0	78.0	15.0
11	.595	.793	.273	.520	88.9	95.5	78.5	17.0
Noon.	.582	.775	.274	.501	89.4	97.0	79.0	18.0
1	.563	.765	.249	.516	89.8	98.2	81.7	16.5
2	.540	.738	.240	.498	89.8	97.5	82.0	15.5
3	.521	.716	.238	.478	89.9	97.2	82.0	15.2
4	.503	.700	.209	.491	89.5	95.0	81.5	14.1
5	.500	.689	.206	.483	88.1	94.2	79.0	15.2
6	.509	.710	.233	.477	86.9	92.5	77.5	15.0
7	.538	.750	.256	.494	85.0	89.8	78.2	11.6
8	.555	.767	.276	.491	83.7	88.5	77.8	10.7
9	.569	.780	.296	.484	82.9	87.4	78.0	9.4
10	.577	.796	.304	.492	82.5	86.5	76.3	10.2
11	.576	.799	.297	.502	82.2	86.0	77.2	8.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	80.0	2.2	78.5	3.7	0.955	10.27	1.27	0.89
1	80.0	2.1	78.5	3.6	.955	.27	.24	.89
2	79.9	2.1	78.4	3.6	.952	.23	.24	.89
3	79.9	1.9	78.0	3.2	.958	.32	.08	.91
4	79.9	1.8	78.6	3.1	.958	.32	.05	.91
5	79.9	1.7	78.7	2.9	.961	.35	0.09	.91
6	80.0	1.7	78.8	2.9	.964	.38	.90	.91
7	80.7	2.1	79.2	3.6	.976	.48	1.27	.89
8	81.3	3.2	79.1	5.4	.973	.42	.93	.84
9	81.8	4.8	78.9	7.7	.967	.30	2.84	.78
10	82.2	5.7	78.8	9.1	.964	.25	3.39	.75
11	82.4	6.5	78.5	10.4	.955	.14	.90	.72
Noon.	82.5	6.9	78.4	11.0	.952	.08	4.17	.71
1	82.7	7.1	78.4	11.4	.952	.08	.34	.70
2	82.4	7.4	78.0	11.8	.940	9.95	.47	.69
3	82.2	7.7	77.6	12.3	.928	.83	.63	.68
4	81.9	7.6	77.3	12.2	.919	.74	.55	.68
5	81.4	0.7	77.4	10.7	.922	.79	3.93	.71
6	81.0	5.9	77.5	9.4	.925	.86	.39	.74
7	80.4	4.6	77.2	7.8	.916	.79	2.74	.78
8	80.1	3.6	77.6	6.1	.928	.95	.12	.82
9	79.8	3.1	77.6	5.3	.928	.97	1.82	.85
10	79.8	2.7	77.9	4.6	.937	10.06	.68	.86
11	79.8	2.4	78.1	4.1	.943	.14	.40	.88

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches		lb	Miles	
1	143.5	...	S & S by W	2.0	270.0	B. to 5 A. M., $\searrow$ i to 7 P. M. B to 11 P. M. Brisk wind from 12½ A. M. to 6 P. M.
2	139.8	...	S & S by E	2.0	336.5	B. to 7 A. M., $\searrow$ i to 1 P. M. B to 11 P. M. Brisk wind from 8½ A. M. to 7½ P. M. L between 7 & 8 P. M.
3	130.3	...	S by E & S	2.8	336.5	S to 2 A. M. B to 7 A. M., $\searrow$ i to 11 A. M. B to 6 P. M. S to 11 P. M. Brisk wind from 9½ A. M., to 6½ P. M. L on N at 8 P. M.
4	142.5	...	S by E & S	1.4	345.3	$\searrow$ i to 8 A. M., $\searrow$ i to 3 P. M., $\searrow$ i to 6 P. M. B to 11 P. M. Brisk wind from 8½ A. M., to 4½ P. M.
5	141.8	0.33	S & S by W	2.0	380.9	$\searrow$ i to 2 A. M., sends from S to 10 A. M. $\searrow$ i to 1 P. M. B to 4 P. M. O to 11 P. M. Brisk wind from 7½ A. M. to 5½ P. M., T & L from 7 to 10 P. M., Slight R from 6½ to 11 P. M.
6	141.8	...	S by W, S & S by E	0.8	343.2	Clouds of different kinds to 9 A. M., $\searrow$ i to 6 P. M. S to 11 P. M. L at 8 & 11 P. M.
7	144.0	...	S & S by E	0.8	293.9	S to 2 A. M., $\searrow$ i to 10 A. M., $\searrow$ i to 8 P. M. B to 11 P. M. L on N N W at 8 P. M.
8	141.4	0.07	S by E & S	1.8	288.6	B to 5 A. M., $\searrow$ i to 7 P. M. O to 11 P. M. Brisk wind from 8½ A. M., to 6 P. M. T from 8½ to 10 P. M., L from 7 to 10 P. M. Light R from 8½ to 11 P. M.
9	135.0	0.38	S by W & S	0.8	318.2	O to 11 A. M., $\searrow$ i to 4 P. M. B to 11 P. M. L at 8 & 11 P. M. Slight R from 3½ to 11 A. M.
10	140.0	0.67	S by E & S	1.0	212.9	B to 8 A. M., $\searrow$ i to 12 A. M. S to 6 P. M. O to 11 P. M. Brisk wind from 9½ to 11 A. M. T from 5½ to 8 P. M. L at 7 & 8 P. M. Slight R at 12½ & 1 & from 7½ to 9 P. M.

$\searrow$  i Cirri, — i Strati,  $\searrow$  i Cumuli,  $\searrow$  i Cirro-strati,  $\searrow$  i Cumulo-strati,  $\searrow$  i Nimbi,  $\searrow$  i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning, R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches		lb	Miles	
11	138.0	0.40	S by E & S	2.3	231.3	O to 2 A. M., $\bar{\wedge}$ i & $\bar{\wedge}$ i to 11 A. M. S to 3 P. M. O to 11 P. M. Brisk wind from 4½ to 5 P. M. T from 4½ to 7 P. M. L from 4½ to 9 P. M. Slight R from 4½ to 8 P. M.
12	...	0.03	S by E, S W & SSE	...	138.0	O to 3 A. M., $\bar{\wedge}$ i to 9 A. M. O to 3 P. M., clouds of different kinds to 11 P. M. T at 11½ A. M. Lon Sat 8 P. M. Light R from 10 A. M. to 1½ P. M.
13	145.0	0.64	SSE & S	0.8	183.0	S to 4 A. M., $\bar{\wedge}$ i to 8 A. M., $\bar{\wedge}$ i to 3 P. M. O to 11 P. M. T from 4 to 11 P. M. L at 2 A. M., & from 5½ to 11 P. M. Slight R at Midnight & from 4½ to 8 & at 10½ P. M.
14	119.5	3.20	SE & SSE	0.5	222.0	O to 2 P. M., $\bar{\wedge}$ i to 9 P. M., $\bar{\wedge}$ i to 11 P. M., T from midnight to 4 A. M. L from midnight to 5 A. M. R from Midnight to 8 A. M.
15	142.7	0.33	SSE & S by E	0.4	143.6	$\bar{\wedge}$ i to 1 A. M. O to 10 A. M., $\bar{\wedge}$ i & $\bar{\wedge}$ i to 8 P. M., $\bar{\wedge}$ i to 11 P. M. T at 5 A. M., Slight R from 3 to 6 A. M.
16	142.5	0.09	SSE & S	0.3	169.4	$\bar{\wedge}$ i to 8 A. M. $\bar{\wedge}$ i to 5 P. M., $\bar{\wedge}$ i to 11 P. M. Light R at 5 & from 10½ to 12½ A. M.
17	148.0	...	S & S by W	0.8	151.2	$\bar{\wedge}$ i to 7 A. M., $\bar{\wedge}$ i to 4 P. M., $\bar{\wedge}$ i to 7 P. M. S to 11 P. M. L on W at 8 P. M. D at 9½ A. M.
18	145.0	0.02	S & SSW	1.2	230.8	S to 1 A. M., $\bar{\wedge}$ i to 8 A. M., $\bar{\wedge}$ i to 3 P. M. O to 11 P. M. T at 2½ & 7½ P. M. L at 7 P. M. Light R at 11½ A. M., 1½ & from 7½ to 9 P. M.
19	141.0	...	S by W & S	...	204.4	S to 3 A. M., $\bar{\wedge}$ i to 7 A. M., $\bar{\wedge}$ i to 3 P. M., $\bar{\wedge}$ i to 11 P. M.
20	146.0	...	S by E & SSE	...	158.1	S to 6 A. M., $\bar{\wedge}$ i to 11 A. M., $\bar{\wedge}$ i to 5 P., $\bar{\wedge}$ i to 11 P. M. L from 8 to 11 P. M.

$\bar{\wedge}$ i Cirri,  $\bar{\wedge}$ i Strati,  $\bar{\wedge}$ i Cumuli,  $\bar{\wedge}$ i Cirro-strati,  $\bar{\wedge}$ i Cumulo-strati,  $\bar{\wedge}$ i Nimbi,  $\bar{\wedge}$ i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1872.*

Solar Radiation, Weather, &c..

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
		Inches		lb	Miles.	
21	140.0	0.66	S E	...	94.2	S to 7 A.M., ~i to 4 P.M. O to 7 P. M., ~i to 11 P. M. T at 12 A. M. 1, 4½ & 6 P. M. L on N. Wat midnight & 1 A. M., Slight, R at 7, from 10 to 12 A. M., & 4½ to 7 P. M.
22	113.6	0.17	E & S S E	...	92.3	Clouds of different kinds. Light R at 3, 9½, 10, 11½ A. M., 1 & 5 P. M.
23	131.0	0.17	E by S, E & S S E	1.0	161.0	~i to 5 A. M., ~i to 8 P. M. B to 11 P. M. L on S W at 8 P. M. Light R at 6, 8½, 11 A. M. 2, 5½, 7 & 7½ P. M.
24	141.0	0.05	E by S & S E	1.9	214.6	Sends to 4 A. M., ~i to 8 A. M., ~i to 11 P. M. Light R at midnight, 1½ 12½ A. M. 1, 2½, 4½ & 5½ P. M.
25	...	0.92	E & E S E	1.6	223.5	~i to 4 A. M. S to 7 A. M., ~i to 11 A. M. O to 11 P. M. T from 12½ to 2 P. M. L from 7½ to 10 P. M. R at 10½ from 11½ A. M., to 2, at 7½, & 10 P. M.
26	135.0	0.45	E S E & E by N	...	117.4	Chiefly O. R after intervals from 2½ to 12½ A. M.
27	137.0	0.04	E & E by N	...	207.0	O to 7 A. M., ~i & ~i to 7 P. M. ~i to 11 P. M., Light R at 2, 3, 4½, 6½ 7½ A. M. 3 & 11½ P. M.
28	125.0	0.47	E by N & E	...	318.0	S to 12 A. M. O to 11 P. M. Brisk wind nearly the whole day. Slight R at midnight, 11½, 12½ A. M., 2, 4, 10 & 10½ P. M.
29	...	0.13	E & E by N	2.0	344.3	O. Brisk wind the whole day Light R after intervals.
30	...	0.23	E N E & E by N	...	380.0	Chiefly O. Brisk wind the whole day Slight R after intervals.

~i Cirri —i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati ~i Nimbi  
~i Cirro-Cumuli, B clear, S straton, O overcast, T thunder, L lightning,  
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of June 1872.*

## MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ...	29.559
Max. height of the Barometer occurred at 11 p. m. on the 15th. ...	29.790
Min. height of the Barometer occurred at 5 p. m. on the 27th. ...	29.206
Extreme range of the Barometer during the month ...	0.593
Mean of the daily Max. Pressures ...	29.616
Ditto ditto Min. ditto ...	29.493
Mean daily range of the Barometer during the month ...	0.123

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	°
Mean Dry Bulb Thermometer for the month ...	85.1
Max. Temperature occurred at 1 p. m. on the 1st. ...	98.2
Min. Temperature occurred at 10 p. m. on the 5th. ...	76.3
Extreme range of the Temperature during the month ...	21.9
Mean of the daily Max. Temperature ...	91.1
Ditto ditto Min. ditto, ...	80.1
Mean daily range of the Temperature during the month ...	11.0

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Mean Wet Bulb Thermometer for the month ...	80.9
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	4.2
Computed Mean Dew-point for the month ...	78.0
Mean Dry Bulb Thermometer above computed mean Dew-point ...	7.1

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	Inches.
Mean Elastic force of Vapour for the month ...	0.940

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	Troy grain.
Mean Weight of Vapour for the month ...	10.05
Additional Weight of Vapour required for complete saturation ...	2.52
Mean degree of humidity for the month, complete saturation being unity ...	0.80

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	°
Mean Max. Solar radiation Thermometer for the month ...	138.3

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	Inches.
Rained 22 days.—Max. fall of rain during 24 hours ...	3.20
Total amount of rain during the month ...	9.45
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ...	8.24
Prevailing direction of the Wind ... S, S. by E. & S. S. E.	

\* Height 70 feet 10 inches above ground.

### MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1872.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fght.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.366	29.516	29.279	0.237	81.7	85.4	79.0	6.4
2	.515	.585	.492	.093	80.8	85.5	78.0	7.5
3	.614	.693	.556	.137	82.1	86.8	79.5	7.3
4	.665	.728	.605	.123	83.1	88.0	79.0	9.0
5	.625	.669	.561	.108	84.0	89.3	80.4	8.9
6	.612	.653	.554	.099	84.6	91.0	80.4	10.6
7	.583	.631	.506	.125	85.0	89.5	81.6	7.9
8	.530	.594	.461	.133	85.9	91.7	82.2	9.5
9	.498	.553	.438	.115	83.9	91.6	80.5	11.1
10	.505	.548	.442	.106	83.3	88.5	80.0	8.5
11	.539	.593	.491	.102	82.5	87.0	79.5	7.5
12	.586	.629	.552	.077	80.9	84.5	78.6	5.9
13	.615	.678	.550	.128	84.1	89.5	78.7	10.8
14	.617	.665	.556	.109	86.3	92.6	81.0	11.6
15	.650	.719	.607	.112	84.9	90.2	82.0	8.2
16	.702	.754	.633	.121	84.7	90.5	80.5	10.0
17	.708	.750	.642	.108	84.2	88.5	80.7	7.8
18	.652	.714	.589	.125	82.9	90.0	80.5	9.5
19	.560	.619	.483	.136	80.7	82.5	79.0	3.5
20	.563	.617	.522	.095	80.4	83.7	78.6	5.1
21	.578	.608	.516	.092	82.2	86.3	78.5	7.8
22	.514	.575	.438	.137	82.7	90.0	79.5	10.5
23	.481	.527	.428	.099	82.9	88.3	79.4	8.9
24	.515	.579	.465	.114	82.4	86.5	79.7	6.8
25	.573	.607	.526	.081	81.0	84.8	78.8	6.0
26	.560	.606	.490	.116	82.9	88.3	80.0	8.3
27	.519	.568	.454	.114	83.0	88.0	79.5	8.5
28	.521	.573	.466	.107	82.4	84.0	81.0	3.0
29	.566	.600	.515	.091	82.8	88.2	79.5	8.7
30	.559	.616	.490	.126	81.0	89.0	80.5	8.5
31	.520	.585	.475	.110	83.9	88.7	79.5	9.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1872.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	79.2	2.5	77.4	4.3	.922	9.93	1.44	.87
2	78.5	2.3	76.9	3.9	.908	.78	.29	.88
3	79.0	3.1	76.8	5.3	.905	.73	.78	.85
4	79.4	3.7	76.8	6.3	.906	.71	2.15	.82
5	80.2	3.8	77.5	6.5	.925	.90	.27	.81
6	80.8	3.8	78.1	6.5	.943	10.08	.31	.81
7	81.2	3.8	78.5	6.5	.955	.21	.32	.82
8	81.6	4.3	78.6	7.3	.958	.23	.64	.80
9	80.9	3.0	78.8	5.1	.964	.34	1.79	.85
10	80.1	3.2	77.9	5.4	.937	.06	.87	.84
11	79.4	3.1	77.2	5.3	.916	9.85	.79	.85
12	79.2	1.7	78.0	2.9	.910	10.13	0.97	.91
13	80.9	3.2	78.7	5.4	.961	.31	1.90	.84
14	81.3	5.0	77.8	8.5	.934	9.95	3.07	.76
15	81.6	3.3	79.3	5.6	.970	10.46	1.03	.84
16	81.2	3.5	78.7	6.0	.961	.29	2.13	.83
17	81.0	3.2	78.8	5.4	.964	.34	1.90	.85
18	80.5	2.4	78.8	4.1	.964	.36	.43	.88
19	79.5	1.2	78.7	2.0	.961	.37	0.67	.94
20	79.1	1.3	78.2	2.2	.916	.21	.73	.93
21	79.6	2.6	77.8	4.3	.934	.05	1.49	.87
22	80.2	2.5	78.4	4.3	.952	.23	.49	.87
23	80.6	2.3	79.0	3.9	.970	.42	.37	.88
24	80.1	2.3	78.5	3.9	.955	.27	.34	.89
25	79.7	1.3	78.8	2.2	.964	.40	0.74	.93
26	80.6	2.3	79.0	3.9	.970	.42	1.37	.88
27	80.7	2.3	79.1	3.9	.973	.45	.37	.88
28	80.5	1.9	79.2	3.2	.976	.50	.11	.90
29	79.9	2.9	77.9	4.9	.937	.06	.69	.86
30	80.7	3.3	78.4	5.6	.952	.19	.98	.84
31	80.8	3.1	78.6	5.3	.958	.28	.85	.85

All the Hygrometrical elements are computed by the Greenwich Constants.

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taken at the Surveyor General's Office, Calcutta,  
in the month of July 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.586	29.750	29.329	0.421	81.2	84.0	79.0	5.0
1	.576	.738	.309	.429	80.9	83.5	79.0	4.5
2	.565	.725	.287	.438	80.7	83.0	79.0	4.0
3	.556	.708	.285	.423	80.4	82.8	78.8	4.0
4	.549	.691	.279	.412	80.3	82.5	78.6	3.9
5	.558	.698	.295	.403	80.1	82.2	78.5	3.7
6	.570	.717	.315	.402	80.2	82.5	78.6	3.9
7	.585	.737	.329	.408	81.0	83.2	78.8	4.4
8	.598	.744	.336	.408	82.2	85.5	78.6	6.9
9	.605	.754	.347	.407	84.0	87.0	79.0	8.0
10	.608	.754	.360	.388	85.2	88.8	79.7	9.1
11	.600	.734	.373	.361	85.7	90.2	80.0	10.2
Noon.	.591	.730	.379	.351	86.1	90.0	79.8	10.2
1	.571	.705	.372	.333	86.6	91.2	78.0	13.2
2	.549	.692	.368	.324	86.7	92.0	78.5	13.5
3	.530	.656	.355	.301	86.4	92.0	79.0	13.0
4	.519	.656	.364	.292	86.1	92.0	80.0	12.0
5	.518	.645	.364	.281	85.1	92.6	80.7	11.9
6	.531	.669	.393	.276	84.2	91.7	81.0	10.7
7	.549	.694	.414	.280	83.3	89.8	80.5	9.3
8	.565	.708	.438	.270	82.6	88.7	79.5	9.2
9	.584	.721	.468	.253	82.1	86.5	79.7	6.8
10	.600	.732	.502	.230	81.8	85.6	79.5	6.1
11	.601	.744	.516	.228	81.6	84.8	79.4	5.4

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived from the observations made at the several hours during the month.

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taken at the Surveyor General's Office, Calcutta,  
in the month of July 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	79.6	1.6	78.5	2.7	.955	10.29	0.92	0.92
1	79.4	1.5	78.3	2.6	.949	.22	.88	.92
2	79.3	1.4	78.3	2.4	.949	.24	.80	.93
3	79.2	1.2	78.4	2.0	.952	.27	.67	.94
4	79.1	1.2	78.3	2.0	.949	.24	.67	.94
5	79.0	1.1	78.2	1.9	.946	.21	.63	.94
6	79.1	1.1	78.3	1.9	.949	.24	.64	.94
7	79.5	1.5	78.4	2.6	.952	.25	.89	.92
8	80.0	2.2	78.5	3.7	.955	.27	1.27	.89
9	80.7	3.3	78.4	5.6	.952	.19	.98	.84
10	81.1	4.1	78.2	7.0	.946	.11	2.50	.80
11	81.2	4.5	78.0	7.7	.940	.03	.77	.78
Noon.	81.1	5.0	77.6	8.5	.928	9.89	3.06	.76
1	81.3	5.3	78.1	8.5	.943	10.04	.10	.76
2	81.4	5.3	78.2	8.5	.946	.07	.11	.76
3	81.3	5.1	77.7	8.7	.931	9.92	.14	.76
4	81.2	4.9	77.8	8.3	.934	.97	2.08	.77
5	81.1	4.0	78.3	0.8	.949	10.14	.43	.81
6	80.9	3.3	78.6	5.6	.958	.26	1.98	.84
7	80.5	2.8	78.5	4.8	.955	.25	.68	.86
8	80.2	2.4	78.5	4.1	.955	.27	.41	.88
9	80.1	2.0	78.7	3.4	.961	.35	.16	.90
10	80.1	1.7	78.9	2.9	.967	.41	0.99	.91
11	79.8	1.8	78.5	3.1	.955	.29	1.05	.91

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
1	114.8	0.64	Variable	...	385.2	Chiefly O. Slight R from midnight to 7, at 12 A. M., 2½, 5, 6 & 7 P. M.
2	...	0.43	...	...	155.0	S. to 3 A. M., N to 7 A. M. O to 7 P. M., N to 11 P. M. Slight R at 8, 9, 10½, 12 A. M. 1, 2 & 6½ P. M.
3	135.0	0.07	S S W	2.5	287.0	Chiefly S. Brisk wind the whole day. Light R at 2½, 12½ A. M. 2½ & 4 P. M.
4	130.5	...	S S W & S W	3.2	327.0	B to 4 A. M., N to 4 P. M., N to 11 P. M. Brisk wind nearly the whole day. D at 1½ P. M.
5	148.0	...	S W & S S W	0.2	349.0	Clouds of different kinds to 4 A. M. O to 8 A. M., N to 6 P. M. O to 11 P. M. T. at 7 P. M. D at 9 P. M.
6	140.2	...	S W & S	0.4	239.0	S to 6 A. M., N to 10 A. M., N to 2 P. M. S to 11 P. M. L on N W at 9 P. M.
7	137.8	...	S by E & S	...	261.3	S to 6 A. M. O to 9 A. M., N to 4 P. M. S to 9 P. M. B 11 P. M. L on N W at 8 P. M.
8	144.8	...	S S E & W S W	...	24.6	B to 5 A. M., N & N to 5 P. M., N to 9 P. M. S to 11 P. M. L on W at 8 & 9 P. M.
9	143.0	0.08	W S W & S S E	...	94.2	N to 2 A. M., N & N to 4 P. M. O to 11 P. M. T at 4 P. M. Light R at 3½, 5 & 7½ P. M.
10	134.0	0.11	Variable	...	130.0	S to 5 A. M., N to 11 A. M., N to 8 P. M. B to 11 P. M. T at 12½ A. M., & 2½ P. M. L between 7 & 8 P. M. Light R at 6, 10½, 12½ A. M., 2½ & 4½ P. M.

N i Cirri,—i Strati, N i Cunuli, N i Cirro-strati, N i Cumulo-strati, N i Nimbi, N i Cirro-cunuli, B clear, S straton, O overcast, T thunder, L lightning, R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	Wind.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches.		lb.	Miles	
11	131.0	0.26	E & S E	4.0	255.6	Chiefly $\curvearrowright$ . Brisk wind from 7 A. M., to 7 P. M. Slight R at 10½ A. M., 2½, 5½, 6½, 7½ & 8½ P. M.
12	...	0.13	Variable	...	236.5	B to 1 A. M. S to 4 A. M., $\curvearrowright$ to 6 A. M. O to 3 P. M., $\curvearrowright$ to 11 P. M. Light R at 3½, 7, 8, 9½ A. M., 1, 1½, 3 & 4½ P. M.
13	139.0	0.17	S S E & S S W	...	109.9	B to 7 A. M., $\curvearrowright$ to 7 P. M. B to 11 P. M. Slight R at 9½, 12 A. M., 2 & 3 P. M.
14	140.8	...	S S W	...	53.9	B to 4 A. M., $\curvearrowright$ to 7 A. M., $\curvearrowright$ to 6 P. M., $\curvearrowright$ to 11 P. M. L on S E at 7½ P. M.
15	134.0	0.53	S S W & S	...	49.4	$\curvearrowright$ to 9 A. M., clouds of different kinds to 11 P. M. T at 12 A. M. R between 11 & 12 A. M.
16	143.0	0.12	S, S by E & S S W	...	45.6	$\curvearrowright$ to 1 A. M. B to 4 A. M., $\curvearrowright$ & $\curvearrowright$ to 4 P. M. S to 11 P. M. T at 2½ P. M. Slight R at 12½ A. M., 2 & 4½ P. M.
17	140.6	0.13	S & S by W	...	61.1	Clouds of various kinds. T at 5 P. M. Slight R at 12½ A. M. 5½ & 7 P. M.
18	146.4	0.08	S & S S W	0.8	62.6	S to 4 A. M., $\curvearrowright$ to 8 A. M., $\curvearrowright$ to 2 P. M. O to 11 P. M. T from 1 to 5 P. M. Light R at 10, 11 A. M., 2, 3, 6, 8 & 9 P. M.
19	...	0.14	S S E	...	50.4	$\curvearrowright$ to 8 A. M. O to 5 P. M., $\curvearrowright$ to 8 P. M., $\curvearrowright$ to 11 P. M. T at 10, 11½ & 12 A. M. L on S at 4½ A. M. Slight R from 11 A. M. to 2 P. M.
20	...	0.13	E & S	...	63.5	$\curvearrowright$ to 3 A. M. S to 7 A. M. O to 7 P. M., $\curvearrowright$ to 11 P. M. Light R at 4½, from 8 A. M. to 2 & 3½ to 4½ P. M.

$\curvearrowright$  Cirri,  $\text{—}$  Strati,  $\curvearrowright$  Cumuli,  $\text{—}$  Cirro-strati,  $\curvearrowright$  Cumulo-strati,  $\text{—}$  Nimbi,  $\text{—}$  Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1872.*

Solar Radiation, Weather, &c..

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	Wind.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
		Inches		lb	Miles.	
21	135.5	...	S S E & S	...	101.5	☼ to 6 A. M., ☾ to 1 P. M. S to 11 P. M. T L & D between 6 & 7 P. M.
22	139.0	0.40	S S E & S	...	66.2	☼ & ☾ to 7 A. M. ☾ to 4 P. M. O to 8 P. M., ☼ to 11 P. M. T at 4 & 5 P. M. L on W at 8 P. M. Slight R at 1, 3½ & 5 P. M.
23	139.4	0.04	S by E & S	...	52.0	☼ to 11 A. M. ☾ to 7 P. M. B to 11 P. M. T between 2½ & 3½ P. M. Light R at 8, 9 A. M. 2½ & 4 P. M.
24	134.0	0.25	E & S S E	0.6	120.4	Chiefly S. Slight R between 11 & 12 A. M., at 2, 6½ & 7½ P. M.
25	132.8	0.63	S S E & S	...	116.5	☼ & ☾ to 4 A. M. O to 5 P. M. S to 11 P. M. T between 12 & 1 P. M. Slight R from 6 to 9, 11½ A. M. to 2½ & at 4½ P. M.
26	136.0	0.46	S, S W, & S S W	1.0	116.6	Chiefly ☼ R at 3 A. M., & between 4 & 5 P. M.
27	134.0	0.04	S S W & S W	0.8	123.3	O to 6 A. M., ☼ to 11 P. M. Light R at 2 & 5 P. M.
28	...	0.03	S S W & S W	...	97.0	Chiefly O. D at 1½ & from 11 A. M. to 11 P. M.
29	135.4	0.39	S W & S S W	...	173.4	O to 8 A. M. S to 1 P. M., ☼ to 4 P. M. O to 11 P. M. Slight R from 4½ to 8 P. M.
30	138.0	0.27	S W & W S W	1.8	126.3	☼ to 7 P. M. O to 11 P. M. T from 7 to 9 P. M. L at 8 & 9 P. M. Slight R at 11½ A. M. & from 7 to 11 P. M.
31	131.0	0.02	W & S	...	105.3	O to 4 A. M. S to 11 P. M. J, between 7 & 8 P. M. D from midnight to 3 & at 5½ A. M.

☼ Cirri — ☼ Strati, ☼ Cumuli, ☼ Cirro-strati, ☼ Cumulo-strati ☼ Nimbi  
☼ Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,  
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of July 1872.*

## MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.569
Max. height of the Barometer occurred at 9 & 10 A. M. on the 16th. ...	29.754
Min. height of the Barometer occurred at 4 A. M. on the 1st. ...	29.279
Extreme range of the Barometer during the month ... ..	0.475
Mean of the daily Max. Pressures ... ..	29.625
Ditto ditto Min. ditto ... ..	29.509
Mean daily range of the Barometer during the month ... ..	0.116

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	°
Mean Dry Bulb Thermometer for the month ... ..	83.1
Max. Temperature occurred at 5 P. M. on the 14th. ... ..	92.6
Min. Temperature occurred at 1 P. M. on the 2nd ... ..	78.0
Extreme range of the Temperature during the month ... ..	14.6
Mean of the daily Max. Temperature ... ..	88.0
Ditto ditto Min. ditto, ... ..	79.9
Mean daily range of the Temperature during the month ... ..	8.1

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Mean Wet Bulb Thermometer for the month ... ..	80.3
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	2.8
Computed Mean Dew-point for the month ... ..	78.3
Mean Dry Bulb Thermometer above computed mean Dew-point ... ..	4.8

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	Inches.
Mean Elastic force of Vapour for the month ... ..	0.949

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	Troy grain.
Mean Weight of Vapour for the month ... ..	10.18
Additional Weight of Vapour required for complete saturation ... ..	1.68
Mean degree of humidity for the month, complete saturation being unity	0.86

	°
Mean Max. Solar radiation Thermometer for the month ... ..	137.1

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	Inches.
Rained 27 days.—Max. fall of rain during 24 hours ... ..	0.64
Total amount of rain during the month ... ..	5.55
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... ..	4.69
Prevailing direction of the Wind ... .. S. S. W, S. W. & S.	

\* Height 70 feet 10 inches above ground.

### MONTHLY RESULTS.

Tables shewing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

[illegible]





*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1872.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fah.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.553	29.617	29.504	0.113	82.4	85.5	80.0	5.5
2	.580	.626	.506	.120	82.2	85.2	80.0	5.2
3	.552	.604	.480	.124	83.1	89.0	79.4	9.6
4	.546	.603	.464	.139	84.2	90.8	81.4	9.4
5	.518	.559	.453	.106	83.9	92.0	81.5	10.5
6	.558	.613	.510	.103	82.4	85.9	79.5	6.4
7	.592	.641	.532	.109	82.8	87.2	80.5	6.7
8	.601	.652	.554	.098	82.8	88.0	79.5	8.5
9	.621	.662	.558	.104	83.7	89.3	80.8	8.5
10	.618	.658	.567	.091	83.1	88.5	80.5	8.0
11	.591	.644	.534	.110	83.0	88.7	80.7	8.0
12	.587	.631	.545	.086	83.5	86.5	81.9	4.6
13	.596	.656	.547	.109	81.6	84.0	78.3	5.7
14	.604	.651	.546	.105	81.3	87.2	77.9	9.3
15	.553	.615	.486	.129	80.6	85.0	77.5	7.5
16	.538	.599	.487	.112	81.8	86.0	78.5	7.5
17	.598	.643	.549	.094	84.0	90.0	79.7	10.3
18	.598	.654	.524	.130	84.6	89.6	81.0	8.6
19	.564	.612	.488	.124	81.0	88.7	80.7	8.0
20	.524	.581	.438	.143	82.8	88.6	79.6	9.0
21	.509	.549	.451	.098	83.4	87.0	81.2	5.8
22	.528	.577	.482	.095	83.6	90.5	81.0	9.5
23	.527	.584	.448	.136	84.6	90.5	80.2	10.3
24	.527	.575	.465	.110	84.2	89.5	80.5	9.0
25	.539	.602	.490	.112	82.1	85.7	80.2	5.5
26	.593	.642	.546	.096	81.0	84.1	79.5	4.6
27	.620	.685	.547	.138	83.8	89.8	79.6	10.2
28	.638	.693	.552	.141	85.0	92.0	80.5	11.5
29	.713	.787	.664	.123	84.6	89.5	81.2	8.3
30	.783	.840	.725	.115	82.9	87.7	79.2	8.5
31	.809	.867	.761	.106	81.3	84.5	79.6	4.9

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1872.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew-Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	80.9	1.5	79.8	2.6	0.995	10.69	0.92	0.92
2	80.6	1.6	79.5	2.7	.986	.60	.94	.92
3	80.7	2.7	78.8	4.6	.964	.34	1.62	.87
4	81.8	2.4	80.1	4.1	1.005	.75	.49	.88
5	81.6	2.3	80.0	3.9	.001	.72	.41	.88
6	80.4	2.0	79.0	3.4	0.970	.44	.17	.90
7	80.8	2.0	79.4	3.4	.983	.56	.19	.90
8	80.8	2.0	79.4	3.4	.983	.56	.19	.90
9	81.3	2.4	79.6	4.1	.989	.60	.47	.88
10	80.9	2.2	79.4	3.7	.983	.54	.32	.89
11	81.3	2.3	79.7	3.9	.992	.63	.40	.88
12	81.5	2.0	80.1	3.4	1.005	.77	.23	.90
13	79.8	1.8	78.5	3.1	0.955	.29	.05	.91
14	79.4	1.9	78.1	3.2	.943	.16	.08	.90
15	78.9	1.7	77.7	2.9	.931	.04	0.97	.91
16	79.5	2.3	77.9	3.9	.937	.08	1.32	.88
17	80.7	3.3	78.4	5.6	.952	.19	.98	.84
18	80.8	3.8	78.1	6.5	.943	.08	2.31	.81
19	80.6	3.4	78.2	5.8	.946	.13	.04	.83
20	80.8	2.0	79.4	3.4	.983	.56	1.19	.90
21	81.7	1.7	80.5	2.9	1.017	.91	.05	.91
22	81.6	2.0	80.2	3.4	.008	.81	.22	.90
23	81.3	3.3	79.0	5.6	0.970	.37	2.02	.84
24	80.8	3.4	78.4	5.8	.952	.19	.05	.83
25	80.3	1.8	79.0	3.1	.970	.44	1.07	.91
26	80.0	1.0	79.3	1.7	.979	.55	0.59	.95
27	80.6	3.2	78.4	5.4	.952	.21	1.89	.84
28	81.3	3.7	78.7	6.3	.961	.29	2.24	.82
29	81.0	3.6	78.5	6.1	.955	.23	.16	.83
30	80.1	2.8	78.1	4.8	.943	.12	1.67	.86
31	79.7	1.6	78.6	2.7	.958	.32	0.92	.92

All the Hygrometrical elements are computed by the Greenwich Constants.

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taken at the Surveyor General's Office, Calcutta,  
in the month of August 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.606	29.827	29.536	0.291	81.5	83.2	78.7	4.5
1	.595	.809	.519	.290	81.2	83.0	78.5	4.5
2	.584	.794	.501	.293	81.9	83.0	78.0	5.0
3	.575	.773	.493	.280	80.7	83.0	77.8	5.2
4	.566	.769	.487	.282	80.6	82.8	77.5	5.3
5	.576	.775	.492	.283	80.4	82.0	77.5	4.5
6	.589	.787	.502	.285	80.3	81.9	77.5	4.4
7	.607	.814	.520	.294	80.8	82.2	77.5	4.7
8	.621	.826	.536	.290	82.2	84.5	78.2	6.3
9	.632	.856	.542	.314	83.7	86.0	80.0	6.0
10	.633	.867	.545	.322	84.6	87.5	79.7	7.8
11	.624	.852	.544	.308	85.7	89.2	80.5	8.7
Noon.	.609	.834	.522	.312	86.4	90.5	79.5	11.0
1	.590	.811	.512	.299	86.9	91.2	79.7	11.5
2	.568	.782	.488	.294	86.9	92.0	80.3	11.7
3	.549	.793	.456	.337	85.8	92.0	81.0	11.0
4	.534	.780	.438	.342	85.2	91.0	79.6	11.4
5	.533	.761	.448	.313	84.8	90.5	80.0	10.5
6	.544	.766	.456	.310	83.8	87.8	79.2	8.6
7	.564	.790	.472	.318	83.2	86.8	80.3	6.5
8	.591	.816	.510	.306	82.5	84.5	79.0	5.5
9	.610	.840	.529	.311	82.2	84.3	77.9	6.4
10	.625	.840	.545	.295	81.9	84.0	78.6	5.4
11	.625	.840	.546	.294	81.6	83.5	78.5	5.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.

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taken at the Surveyor General's Office, Calcutta,  
in the month of August 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	80.2	1.3	79.3	2.2	0.979	10.55	0.76	0.93
1	80.1	1.1	79.3	1.9	.979	.55	.66	.94
2	79.9	1.0	79.2	1.7	.976	.52	.68	.95
3	79.8	0.9	79.2	1.5	.976	.52	.52	.95
4	79.7	0.9	79.1	1.5	.973	.49	.52	.95
5	79.5	0.9	78.9	1.5	.967	.43	.51	.95
6	79.5	0.8	78.9	1.4	.967	.46	.45	.96
7	79.7	1.1	78.9	1.9	.967	.43	.64	.94
8	80.4	1.8	79.1	3.1	.973	.47	1.07	.91
9	81.2	2.5	79.4	4.3	.983	.54	.53	.87
10	81.3	3.3	79.0	5.6	.970	.37	2.02	.84
11	81.7	4.0	78.9	6.8	.967	.32	.48	.81
Noon.	82.0	4.4	78.9	7.5	.967	.30	.76	.79
1	81.9	5.0	78.9	8.0	.967	.30	.95	.78
2	82.0	4.9	79.1	7.8	.973	.36	.89	.78
3	81.9	3.9	79.2	6.6	.976	.41	.42	.81
4	81.5	3.7	78.9	6.3	.967	.31	.27	.82
5	81.5	3.3	79.2	5.6	.976	.43	.03	.84
6	81.1	2.7	79.2	4.6	.976	.45	1.65	.86
7	80.7	2.5	78.9	4.3	.967	.39	.50	.87
8	80.3	2.2	78.8	3.7	.964	.36	.28	.89
9	80.4	1.8	79.1	3.1	.973	.47	.07	.91
10	80.3	1.6	79.2	2.7	.976	.50	0.94	.92
11	80.2	1.4	79.2	2.4	.976	.52	.82	.93

All the Hygrometrical elements are computed by the Greenwich Constants.

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in the month of August 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
1	105.0	0.07	N by E & S S W	...	58.8	S to 3 A. M. O to 11 P. M. T from 2½ to 5 P. M. Light R at 4, 6, 8 A. M., from 3 to 7 & at 10 & 11 P. M.
2	122.7	0.14	S S W & S by E	...	48.7	O to 12 A. M., ̂i to 3 P. M. O to 11 P. M. T at 2 & 9½ P. M. L at 9 P. M. Light R after intervals.
3	139.5	0.19	SSW, S S by E	...	37.8	O to 5 A. M., ̂i to 10 A. M., ̂i to 3 P. M. S to 7 P. M. B to 11 P. M. Slight R from midnight to 2 A. M.
4	140.0	0.41	S by E & S	1.8	69.4	B to 5 A. M., ̂i & ̂i to 6 P. M. S to 11 P. M. T from 1½ to 3 P. M. L at 2½, 8 & 11 P. M. R at 2 P. M.
5	144.0	0.34	S by E & S S E	...	127.8	S to 2 A. M., ̂i to 5 A. M., ̂i to 8 P. M. B to 11 P. M. R at 3, 5 & 6½ P. M.
6	130.0	0.56	SE, & E by S & S [by E]	1.0	156.0	B to 3 A. M. S to 7 A. M. O to 3 P. M., ̂i to 7 P. M. S to 11 P. M. T at 1 P. M. R from 8½ to 10 A. M. & at 1 P. M.
7	138.5	0.25	S S E & S	1.8	96.5	S to 5 A. M., clouds of different kinds to 2 P. M. O to 6 P. M. B to 11 P. M. T at 11½ A. M. & 2½ P. M. Slight R at 12 A. M., & from 2 to 4 P. M.
8	130.5	0.51	S, SSW & S by W	...	153.2	B to 3 A. M. O to 7 A. M. ̂i to 8 P. M. B to 11 P. M. Slight R at 4½, 6, 7½, 9½, 10½ A. M., 2½ & 5½ P. M.
9	139.6	0.22	S by W & S	1.2	146.5	B to 5 A. M., ̂i to 8 A. M., ̂i to 7 P. M. B to 11 P. M. Slight R at 10½, 11½ A. M., 2 & 3½ P. M.
10	140.8	0.26	S & S by W	...	92.7	B to 2 A. M., ̂i to 3 P. M. Clouds of different kinds to 11 P. M. T between 3 & 4 P. M. Slight R at 1½, 3½ to 4½ & at 6½ P. M.

̂i Cirri,—i Strati, ̂i Cumuli, ̂i Cirro-strati, ̂i Cumulo-strati, ̂i Nimbi,  
̂i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning,  
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles	
11	146.5	0.03	S by W & S S W	...	62.9	☾i & ☾i to 10 A. M. S to 11 P. M. T & L at 7½ P. M. Light R at 6½ A. M., 7 & 8 P. M.
12	130.0	...	S by W & S	...	72.2	S to 5 P. M., ☾i to 8 P. M., ☾i to 11 P. M. D at 11 A. M. & 1 P. M.
13	105.0	0.35	S	...	115.2	O to 3 P. M., ☾i to 6 P. M., S to 11 P. M. Slight R from 1½ to 8 & at 10½ A. M.
14	137.2	2.42	S	0.4	107.7	S to 3 A. M. O to 8 A. M., ☾i to 2 P. M. O to 11 P. M. T between 2 & 3 P. M. R after intervals.
15	142.3	2.20	S & S by E	0.3	65.3	O to 8 A. M., ☾i to 11 P. M. R after intervals.
16	143.2	0.21	S & S S W	...	65.5	☾i to 4 A. M. O to 9 A. M., ☾i to 5 P. M., ☾i to 11 P. M. Slight R at 6, 9 A. M. & 2½ P. M.
17	144.0	...	S S W & S	...	99.9	B to 6 A. M., ☾i to 3 P. M., ☾i to 11 P. M.
18	143.8	...	S W & S S W	...	141.6	☾i to 10 A. M., ☾i to 3 P. M. O to 6 P. M., ☾i to 11 P. M. D at 11½ P. M.
19	143.4	0.10	S S W & W S W	...	67.0	☾i to 7 A. M., ☾i to 3 P. M., ☾i to 6 P. M. S to 11 P. M. L from 7 to 9 P. M. T at 9 P. M. Slight R at 4½, 8½ A. M., 10 & 11 P. M.
20	145.0	0.30	W S W & W	...	28.8	O to 9 A. M., ☾i to 5 P. M. O to 11 P. M. T at 4½ P. M. Slight R after intervals,
21	146.0	0.58	W by S & S S W	...	25.3	Chiefly S. L from 8 to 10 P. M. Slight R after intervals.
22	142.8	0.23	SE, SSE & S by E	0.2	45.0	☾i & ☾i to 7 A. M., ☾i to 5 P. M. ☾i to 11 P. M. T at 1½, 2, 3 & 5 P. M. L at 2½ P. M. Slight R at 8½ A. M. 2 & 5 P. M.
23	143.2	...	ESE, E by N & SE	0.2	82.4	B to 3 A. M., ☾i to 7 A. M., ☾i to 8 P. M. B to 11 P. M. L at 8 & 11 P. M. Light R at 3½ P. M.

☾i Cirri, ☾i Strati, ☾i Cumuli, ☾i Cirro-strati, ☾i Cumulo-strati, ☾i Nimbi,  
☾i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning  
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1872.*

Solar Radiation, Weather, &c..

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
24	137.2	0.09	E by N & S S E.	...	166.8	B to 1 A. M., \i to 7 A. M., \i to 7 P. M. B to 10 P. M. O to 11 P. M. Slight R at 11½ A. M. & 9½ P. M.
25	122.0	0.10	S E	0.7	150.0	O to 6 A. M., \i to 10 A. M. O to 5 P. M. S to 11 P. M. Light R at 3, 4, from 12½ A. M., to 5 & at 11 P. M.
26	...	0.94	S E & S S E	0.5	109.8	O to 3 A. M., \i to 8 A. M. O to 4 P. M. S to 9 P. M. B to 11 P. M. T at 10½ & 11 A. M. L at 4, 5 A. M., & 8 P. M. R at midnight 1, 5½, & from 9½ A. M. to 3 P. M.
27	144.0	...	S S E, S E & S by W	0.3	98.5	B to 2 A. M., \i to 8 A. M., \i to 1 P. M., \i to 11 P. M., D at 9½ A. M.,
28	145.0	...	S	...	68.7	\i & \i to 8 A. M., \i to 7 P. M., \i to 11 P. M. T at 5 P. M., L at 7, 8 & 10½ P. M.
29	145.0	...	S & S E	...	28.8	\i to 7 A. M., \i to 5 P. M. \i to 9 P. M. S to 11 P. M. D at 4 P. M.
30	145.0	0.04	S	0.4	91.5	S to 5 A. M., \i to 3 P. M. S to 11 P. M. Light R between 5 & 6 P. M.
31	124.8	0.98	S	0.6	93.1	S to 3 A. M., \i to 11 A. M. O to 11 P. M. R from 12½ A. M. to 4 P. M.

\i Cirri — i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati \i Nimbi  
\i Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,  
R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of August 1872.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ... ..	29.590
Max. height of the Barometer occurred at 10 A. M. on the 31st. ...	29.867
Min. height of the Barometer occurred at 4 P. M. on the 20th. ...	29.438
Extreme range of the Barometer during the month ... ..	0.429
Mean of the daily Max. Pressures ... ..	29.643
Ditto ditto Min. ditto ... ..	29.529
Mean daily range of the Barometer during the month ... ..	0.114

	°
Mean Dry Bulb Thermometer for the month ... ..	83.1
Max. Temperature occurred at 2 & 3 P. M. on the 5th & 28th. ...	92.0
Min. Temperature occurred at 4, 5, 6, & 7 A. M. on the 15th ...	77.5
Extreme range of the Temperature during the month ... ..	14.5
Mean of the daily Max. Temperature ... ..	83.0
Ditto ditto Min. ditto, ... ..	80.1
Mean daily range of the Temperature during the month ... ..	7.9

Mean Wet Bulb Thermometer for the month ... ..	80.7
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	2.4
Computed Mean Dew-point for the month ... ..	79.0
Mean Dry Bulb Thermometer above computed mean Dew-point ...	4.1

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.970

	Troy grain.
Mean Weight of Vapour for the month ... ..	10.42
Additional Weight of Vapour required for complete saturation ...	1.44
Mean degree of humidity for the month, complete saturation being unity	0.88

	°
Mean Max. Solar radiation Thermometer for the month ... ..	136.9

	Inches.
Rained 29 days,—Max. fall of rain during 24 hours ... ..	2.42
Total amount of rain during the month ... ..	11.52
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... ..	11.01
Prevailing direction of the Wind ... ..	S. & S. S. W.

\* Height 70 feet 10 inches above ground.

Tables showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

Hour.	N.	N. by E.	N. N. E.	N. E.	E. N. E.	E. N.	E. by N.	E.	Rain on.	E. by S.	E. S. E.	Rain on.	S. E.	Rain on.	S. E.	Rain on.	S. S. E.	S. S. E.	S. S. W.	Rain on.	S. W.	Rain on.	W. S. W.	Rain on.	W. by S.	Rain on.	W.	Rain on.	W. by N.	W. N. W.	W. N.	Rain on.	N. W.	Rain on.	N. N. W.	N. by W.	Rain on.	N.		
Mid night																																								
1																																								
2																																								
3																																								
4																																								
5																																								
6																																								
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*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1872.*

Latitude  $22^{\circ} 33' 1''$  North. Longitude  $88^{\circ} 20' 34''$  East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at $32^{\circ}$ Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.814	29.885	29.749	0.136	70.8	81.5	77.6	3.9
2	.760	.823	.677	.146	82.5	87.8	79.0	8.8
3	.748	.806	.692	.114	83.6	88.0	80.2	7.8
4	.791	.841	.733	.108	82.4	87.4	77.8	9.6
5	.790	.855	.712	.143	81.1	84.3	76.7	7.6
6	.764	.842	.691	.151	81.4	86.5	77.4	9.1
7	.742	.801	.681	.120	82.1	88.0	77.8	10.2
8	.737	.804	.672	.132	83.2	88.2	78.0	10.2
9	.742	.818	.659	.159	85.2	91.5	81.5	10.0
10	.742	.812	.663	.149	85.4	90.5	80.6	9.9
11	.641	.732	.645	.187	87.3	92.1	83.9	8.2
12	.585	.691	.518	.173	81.7	83.7	77.8	5.9
13	.703	.775	.637	.138	82.3	86.5	79.0	7.5
14	.707	.778	.627	.151	84.2	91.0	80.0	11.0
15	.725	.781	.654	.127	84.0	92.6	80.5	12.1
16	.764	.818	.716	.102	85.1	90.2	81.4	8.8
17	.780	.836	.705	.131	85.2	91.1	81.3	9.8
18	.760	.824	.689	.135	85.4	90.5	80.5	10.0
19	.691	.750	.632	.118	82.4	89.8	79.0	10.8
20	.603	.693	.509	.184	78.9	81.0	77.3	3.7
21	.671	.733	.617	.116	82.3	88.0	79.0	9.0
22	.708	.757	.668	.089	81.9	86.3	78.8	7.5
23	.693	.737	.632	.105	83.1	88.7	79.0	9.7
24	.672	.719	.607	.112	82.3	87.0	80.0	7.0
25	.696	.741	.642	.099	82.9	89.0	79.5	9.5
26	.755	.814	.685	.129	82.4	87.5	79.2	8.3
27	.778	.843	.713	.130	82.1	87.7	79.0	8.7
28	.763	.839	.689	.150	83.6	89.0	79.4	9.6
29	.738	.804	.666	.138	83.7	89.3	79.5	9.8
30	.696	.751	.619	.132	85.0	90.2	81.0	9.2

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1872.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	78.4	1.4	77.4	2.4	0.922	9.97	0.78	0.93
2	79.5	3.0	77.4	5.1	.922	.91	1.73	.83
3	80.1	3.5	77.6	6.0	.928	.95	2.08	.83
4	79.5	2.9	77.5	4.9	.925	.94	1.67	.86
5	79.2	1.9	77.9	3.2	.937	10.10	.07	.90
6	79.3	2.1	77.8	3.6	.934	.05	.22	.89
7	79.3	2.8	77.3	4.8	.919	9.88	.63	.86
8	79.8	3.4	77.4	5.8	.922	.89	2.00	.83
9	81.4	3.8	78.7	6.5	.961	10.26	.35	.81
10	81.6	3.8	78.9	6.5	.967	.32	.36	.81
11	82.8	4.5	80.1	7.2	1.005	.69	.72	.80
12	78.8	2.9	76.8	4.9	0.905	9.73	1.64	.86
13	79.9	2.4	78.2	4.1	.946	10.17	.41	.88
14	81.0	3.2	78.8	5.4	.964	.34	.90	.85
15	81.4	3.5	78.9	6.0	.967	.34	2.15	.83
16	80.8	4.3	77.8	7.3	.934	9.99	.58	.80
17	80.6	4.6	77.4	7.8	.922	.85	.76	.78
18	80.4	5.0	76.9	8.5	.908	.68	3.00	.76
19	79.9	2.5	78.1	4.3	.943	10.14	1.47	.87
20	77.7	1.2	76.9	2.0	.908	9.82	0.65	.94
21	80.2	2.1	78.7	3.6	.961	10.33	1.25	.89
22	79.8	2.1	78.3	3.6	.949	.20	.24	.89
23	80.2	2.9	78.2	4.9	.946	.15	.71	.86
24	80.0	2.3	78.4	3.9	.952	.23	.35	.88
25	80.3	2.6	78.5	4.4	.955	.27	.52	.87
26	79.8	2.6	78.0	4.4	.940	.11	.60	.87
27	79.6	2.5	77.8	4.3	.934	.05	.46	.87
28	79.9	3.7	77.3	6.3	.919	9.86	2.17	.82
29	80.5	3.2	78.3	5.4	.949	10.18	1.89	.84
30	81.7	3.3	79.4	5.6	.983	.49	2.04	.84

All the Hygrometrical elements are computed by the Greenwich Constants.

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taken at the Surveyor General's Office, Calcutta,  
in the month of September 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Falst.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.740	29.825	29.563	0.262	81.2	85.5	77.5	8.0
1	.730	.813	.549	.264	80.9	85.1	77.6	7.5
2	.720	.802	.535	.267	80.6	84.7	77.5	7.2
3	.712	.794	.555	.239	80.4	84.5	77.5	7.0
4	.706	.789	.518	.271	80.1	84.1	77.5	6.6
5	.718	.805	.509	.296	79.8	83.9	77.3	6.6
6	.733	.814	.512	.302	79.9	84.0	77.7	6.3
7	.748	.835	.519	.316	80.5	84.2	78.0	6.2
8	.768	.848	.570	.269	82.5	86.4	77.9	8.5
9	.781	.863	.591	.272	84.0	87.5	78.2	9.3
10	.789	.885	.606	.279	85.1	89.2	77.6	11.6
11	.769	.870	.598	.272	86.0	89.9	78.0	11.9
Noon.	.751	.854	.573	.281	86.6	90.5	79.0	11.5
1	.725	.833	.552	.281	87.1	92.0	79.2	12.8
2	.697	.808	.536	.272	87.1	92.6	79.4	13.2
3	.675	.782	.520	.262	86.5	91.5	79.4	12.1
4	.664	.774	.518	.256	85.8	91.0	79.7	11.3
5	.667	.758	.515	.213	85.2	90.4	80.4	10.0
6	.677	.781	.553	.228	83.9	89.0	77.8	11.2
7	.691	.784	.561	.223	83.2	87.4	78.0	9.4
8	.718	.814	.569	.245	82.5	86.7	77.5	9.2
9	.738	.828	.595	.233	82.2	86.0	76.9	9.1
10	.748	.841	.691	.237	81.9	86.0	76.7	9.3
11	.745	.827	.584	.243	81.6	85.5	77.1	8.4

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- moneter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Mid- night.	79.6	1.6	78.5	2.7	0.955	10.29	0.92	0.92
1	79.5	1.4	78.5	2.4	.955	.31	.79	.93
2	79.2	1.4	78.2	2.4	.946	.21	.80	.93
3	79.0	1.4	78.0	2.4	.940	.15	.79	.93
4	78.8	1.3	77.9	2.2	.937	.12	.72	.93
5	78.6	1.2	77.8	2.0	.934	.09	.66	.94
6	78.7	1.2	77.9	2.0	.937	.12	.66	.94
7	79.2	1.3	78.3	2.2	.949	.24	.74	.93
8	80.1	2.4	78.4	4.1	.952	.23	1.41	.88
9	80.5	3.5	78.0	6.0	.940	.07	2.10	.83
10	80.7	4.4	77.6	7.5	.928	9.91	.66	.79
11	81.0	5.0	77.5	8.5	.925	.86	3.05	.76
Noon.	81.2	5.4	78.0	8.6	.940	10.01	.13	.76
1	81.4	5.7	78.0	9.1	.940	.01	.32	.75
2	81.2	5.9	77.7	9.4	.931	9.92	.41	.74
3	81.1	5.4	77.9	8.6	.937	.98	.12	.76
4	81.0	4.8	77.6	8.2	.928	.91	2.92	.77
5	80.8	4.4	77.7	7.5	.931	.94	.67	.79
6	80.5	3.4	78.1	5.8	.943	10.10	.03	.83
7	80.5	2.7	78.6	4.6	.958	.28	1.61	.87
8	80.0	2.5	78.2	4.3	.946	.17	.47	.87
9	80.0	2.2	78.5	3.7	.955	.27	.27	.89
10	79.9	2.0	78.5	3.4	.955	.29	.15	.90
11	79.9	1.7	78.7	2.9	.961	.35	0.99	.91

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
1	o	Inches		lb	Miles	
1	...	1.05	S S W	0.7	78.9	Chiefly O. R at 2, 3½ & from 8½ A. M. to 1 P. M.
2	138.0	...	S S W & S W	1.4	154.2	\\i & \\i to 4 A. M., clouds of different kinds to 11 P. M.
3	135.0	...	S W & S S W	1.0	218.2	S to 10 A. M., \\i to 5 P. M. S to 11 P. M.
4	127.0	0.75	S W, & S S W	4.8	233.1	O to 11 A. M., \\i to 5 P. M. O to 11 P. M. Strong wind T & L between 5 & 6 P. M. Slight R from 5½ to 10½ P. M.
5	109.8	1.67	S W & S S W	1.3	148.6	O. T at 7½ & 9½ P. M. R at 3, 8 A. M. & from 7 to 11 P. M.
6	147.5	...	S S W & S	...	120.6	O to 11 A. M., \\i to 3 P. M. S to 11 P. M. L on W at 8 P. M. D at midnight.
7	142.3	0.19	S & S by W	...	70.8	O to 5 A. M. \\i to 11 A. M. \\i to 2 P. M. S. to 6 P. M. B. to 11 P. M. Slight R. from midnight to 2 A. M. & at 2 P. M.
8	140.4	...	W S W & W by S	...	41.7	B to 4 A. M. \\i to 9 A. M. \\i to 5 P. M. S to 11 P. M. L from 8½ to 10 P. M.
9	143.3	...	S by W & Variable	...	22.5	B to 4 A. M. \\i to 6 A. M. \\i to 8 A. M. \\i to 3 P. M. S to 6 P. M. \\i & \\i to 11 P. M. T at 2½ P. M. L. at 10 & 11 P. M.
10	143.8	...	W S W & N W	...	28.7	\\i to 4 P. M. \\i to 8 P. M. \\i to 11 P. M. L at midnight.
11	139.0	...	N W & N by W	...	22.4	\\i to 7 A. M., \\i to 4 P. M., \\i to 10 P. M. \\i at 11 P. M. L on E at 10 & 11 P. M.
12	111.7	1.36	E S E	4.8	253.4	O to 8 A. M. S to 12 A. M. O to 7 P. M. S to 11 P. M. Strong wind between 3 & 3½ & from 8½ A. M. to 5 P. M. L at midnight T at 3 & 4 A. M. R from 3 to 5 at 12 A. M. 2, 3, 6½ & 8 P. M.

\\i Cirri,—i Strati, \\i Cumuli, \\i Cirro-strati, \\i Cumulo-strati, \\i Nimbi, \\i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning, R rain, D drizzle.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1872.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles	
13	137.0	0.53	SE & S	1.4	246.8	Clouds of different kinds. T at 10½ & 12 A. M. R between 1 & 2, at 4, 9½ & from 10½ to 12 A. M.
14	142.0	0.20	SE & SSE	1.9	48.7	B to 3 A. M. \i to 10 A. M. \i to 6 P. M. \i to 11 P. M. T between 3 & 4 P. M. R at 3½ P. M.
15	145.0	0.20	SSE & E. S. E	0.6	88.5	\i to 11 A. M. \i to 7 P. M. B to 11 P. M. T between 3 & 4 P. M. R at 3 P. M.
16	144.8	...	SSE & S	...	93.2	B to 6 A. M. \i to 10 A. M. \i to 6 P. M. \i to 9 P. M. \i to 11 P. M.
17	143.3	0.12	S & SE	...	66.0	B to 7 A. M. \i to 11 P. M. Slight R at 5½, 7 & 8 P. M.
18	145.0	...	SE & variable	...	36.1	\i to 2 A. M. B to 6 A. M. \i to 9 A. M. \i to 4 P. M. \i to 11 P. M. L between 6 & 7 P. M.
19	142.0	0.50	NNE & ENE	0.5	65.2	\i to 11 A. M. O to 4 P. M. S to 9 P. M. O to 11 P. M. R from 1½ to 4 & at 10 & 11 P. M.
20	...	1.48	NW & SW	4.0	302.8	O to 6 P. M. \i to 11 P. M. High wind from 1 to 9½ A. M. L on W between 10 & 11 P. M. R from midnight to 10 A. M.
21	138.0	...	SSW & SSE	...	58.1	S to 7 A. M. \i & \i to 4 P. M. S to 11 P. M. Slightly foggy at 5 & 6 A. M.
22	142.0	0.16	S by E & S	...	24.8	S to 2 A. M. O to 10 A. M. \i to 6 P. M. B to 9 P. M. O to 11 P. M. T at 2 & 11½ P. M. Slight R at 3, 4, 5, A. M. 1½ & 11½ P. M.
23	143.5	...	S by ES & S by W	...	20.5	O to 3 A. M. \i to 1 P. M. \i to 6 P. M. B to 11 P. M.
24	136.4	...	S & S by W	...	78.6	\i to 8 A. M. \i to 12 A. M. S to 6 P. M. B to 11 P. M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning  
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1872.*

Solar Radiation, Weather, &c..

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
25	139.5	0.03	S E, ESE & SSE	...	109.3	B to 3 A. M. \i & \i to 6 P. M. B to 11 P. M. L on W at 7 P. M. Light R at 11 A. M.
26	141.0	0.07	SSE & S	...	127.5	B to 3 A. M. O to 6 A. M. \i to 3 P. M. \i to 9 P. M. B to 11 P. M. L on W at 11½ P. M. Light R at 12 A. M. 2½ & 3 P. M.
27	142.0	...	E by S & S by W	...	65.0	B to 4 A. M. \i to 9 A. M. \i to 6 P. M. B to 11 P. M. D at 1½ P. M.
28	141.0	...	S, & S S W	...	40.6	B to 7 A. M. \i to 6 P. M. B to 11 P. M. D at 5½ P. M.
29	140.0	0.11	S, S W & S by W	...	75.0	B to 2 A. M. \i to 6 P. M. B to 11 P. M. L on W at 11 P. M. Slight R from 3½ to 4½ P. M.
30	146.8	...	S S W	...	76.3	S to 5 A. M. \i & \i to 6 P. M. S to 11 P. M. T at 5½ P. M. L at midnight 1 & 5 A. M. & from 5½ to 7 P. M.

\i Cirri —i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati \i Nimbi  
\i Cirro-Cumuli, B clear, S stratoni, O overcast, T thunder, L lightning,  
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of September 1872.*

## MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.725
Max. height of the Barometer occurred at 10 A. M. on the 1st. ...	29.885
Min. height of the Barometer occurred at 5 A. M. on the 20 th. ...	29.509
Extreme range of the Barometer during the month ... ..	0.376
Mean of the daily Max. Pressures ... ..	29.790
Ditto ditto Min. ditto ... ..	29.657
Mean daily range of the Barometer during the month ... ..	0.133

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	°
Mean Dry Bulb Thermometer for the month ... ..	83.1
Max. Temperature occurred at 2 P. M. on the 15th ... ..	92.6
Min. Temperature occurred at 10 P. M. on the 5th ... ..	76.7
Extreme range of the Temperature during the month ... ..	15.9
Mean of the daily Max. Temperature ... ..	88.2
Ditto ditto Min. ditto, ... ..	79.4
Mean daily range of the Temperature during the month ... ..	8.8

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Mean Wet Bulb Thermometer for the month ... ..	80.1
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	3.0
Computed Mean Dew-point for the month ... ..	78.0
Mean Dry Bulb Thermometer above computed mean Dew-point ...	5.1

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	Inches.
Mean Elastic force of Vapour for the month ... ..	0.940

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	Troy grain.
Mean Weight of Vapour for the month ... ..	10.09
Additional Weight of Vapour required for complete saturation ...	1.77
Mean degree of humidity for the month, complete saturation being unity	0.85

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	°
Mean Max. Solar radiation Thermometer for the month ... ..	138.8

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	Inches.
Rained 18 days,—Max. fall of rain during 24 hours ... ..	1.67
Total amount of rain during the month ... ..	8.42
Total amount of rain indicated by the Gauge* attached to the anemometer	
during the month ... ..	7.39
Prevailing direction of the Wind ... .. S. S. W. & S.	

\* Height 70 feet 10 inches above ground.



1. The first part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom. It is shown that the structure of the atom is determined by the laws of quantum mechanics, which are based on the principle of the conservation of energy and the principle of the conservation of momentum. The paper then proceeds to a detailed discussion of the structure of the atom, showing how the laws of quantum mechanics lead to the prediction of the existence of discrete energy levels and the emission of light in the form of spectral lines. The paper concludes with a discussion of the experimental evidence for the structure of the atom, showing how the results of experiments on the emission and absorption of light are in agreement with the predictions of quantum mechanics.

2. The second part of the paper is devoted to a discussion of the general principles of the theory of the structure of the molecule. It is shown that the structure of the molecule is determined by the laws of quantum mechanics, which are based on the principle of the conservation of energy and the principle of the conservation of momentum. The paper then proceeds to a detailed discussion of the structure of the molecule, showing how the laws of quantum mechanics lead to the prediction of the existence of discrete energy levels and the emission of light in the form of spectral lines. The paper concludes with a discussion of the experimental evidence for the structure of the molecule, showing how the results of experiments on the emission and absorption of light are in agreement with the predictions of quantum mechanics.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1872.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Falt.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.696	29.763	29.623	0.140	84.2	88.0	81.0	7.0
2	.724	.782	.672	.110	83.1	90.6	80.8	9.8
3	.708	.767	.642	.125	84.3	91.0	79.8	11.2
4	.721	.785	.664	.121	85.0	91.2	80.5	10.7
5	.756	.803	.708	.095	84.1	90.0	81.5	8.5
6	.795	.861	.741	.120	84.9	91.3	80.5	10.8
7	.771	.843	.684	.159	84.8	90.0	81.2	8.8
8	.764	.842	.694	.148	83.0	88.2	79.5	8.7
9	.785	.837	.733	.104	81.1	84.7	77.2	7.5
10	.787	.844	.733	.111	82.5	88.5	77.8	10.7
11	.799	.856	.742	.114	81.8	88.3	75.0	13.3
12	.854	.910	.802	.108	81.7	88.0	76.3	11.7
13	.899	.955	.849	.106	79.9	84.0	76.4	7.6
14	.889	.953	.822	.131	79.4	81.8	77.5	4.3
15	.851	.912	.786	.126	78.7	84.4	75.5	8.9
16	.837	.904	.793	.111	80.2	86.6	75.5	11.1
17	.857	.923	.811	.112	82.3	88.0	77.0	11.0
18	.851	.923	.791	.132	83.1	89.0	77.2	11.8
19	.850	.906	.810	.096	83.6	89.3	78.0	11.3
20	.896	.951	.853	.098	83.5	89.5	78.0	11.5
21	.933	30.005	.888	.117	82.7	89.8	76.5	13.3
22	.909	29.973	.837	.136	81.6	88.9	75.3	13.6
23	.888	.937	.829	.108	81.3	88.0	74.9	13.1
24	.885	.938	.827	.111	76.3	80.0	73.2	6.8
25	.788	.885	.695	.200	73.0	76.0	71.5	4.5
26	.712	.806	.631	.175	79.7	84.5	76.2	8.3
27	.821	.889	.777	.103	77.9	83.0	73.0	10.0
28	.833	.884	.789	.095	78.9	83.2	76.0	7.2
29	.896	.957	.832	.125	79.8	85.0	76.0	9.0
30	.931	30.000	.886	.114	80.4	85.5	75.9	9.6
31	.941	.000	.901	.099	80.1	86.0	75.2	10.8

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1872.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	81.6	2.6	79.8	4.4	0.995	10.66	1.58	0.87
2	80.7	2.4	79.0	4.1	.970	.42	.44	.88
3	81.1	3.2	78.9	5.4	.967	.37	.91	.84
4	81.0	4.0	78.2	6.8	.946	.11	2.42	.81
5	81.0	3.1	78.8	5.3	.964	.34	1.87	.85
6	81.1	3.8	78.4	6.5	.952	.17	2.32	.81
7	81.2	3.6	78.7	6.1	.961	.29	.17	.83
8	79.4	3.6	76.9	6.1	.908	9.74	.08	.82
9	78.4	2.7	76.5	4.6	.896	.65	1.52	.86
10	76.8	5.7	72.8	9.7	.795	8.54	3.10	.73
11	76.3	5.5	72.4	9.4	.785	.45	2.95	.74
12	76.4	5.3	72.7	9.0	.792	.52	.85	.75
13	76.6	3.3	74.3	5.6	.835	9.01	1.77	.84
14	77.2	2.2	75.7	3.7	.873	.43	.19	.89
15	75.7	3.0	73.0	5.1	.817	8.84	.57	.85
16	76.9	3.3	74.6	5.6	.843	9.09	.79	.84
17	78.1	4.2	75.2	7.1	.860	.24	2.34	.80
18	78.2	4.9	74.8	8.3	.849	.11	.75	.77
19	78.4	5.2	74.8	8.8	.849	.09	.94	.76
20	77.7	5.8	73.6	9.9	.817	8.75	3.25	.73
21	76.2	6.5	71.6	11.1	.766	.22	.50	.70
22	73.8	7.8	68.3	13.3	.688	7.40	.94	.65
23	75.0	6.3	70.6	10.7	.741	.97	.27	.71
24	74.5	1.8	73.2	3.1	.806	8.77	0.92	.91
25	72.3	0.7	71.7	1.3	.768	.42	.34	.96
26	77.5	2.2	76.0	3.7	.882	9.52	1.20	.89
27	74.7	3.2	72.5	5.4	.787	8.54	.62	.84
28	76.4	2.5	74.6	4.3	.843	9.13	.34	.87
29	76.8	3.0	74.7	5.1	.846	.14	.61	.85
30	76.0	4.4	72.9	7.5	.797	8.59	2.35	.79
31	75.0	5.1	71.4	8.7	.761	.20	.64	.76

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 39° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.833	29.937	29.696	0.241	79.3	83.5	73.1	10.4
1	.823	.931	.666	.265	78.9	83.2	72.6	10.6
2	.813	.921	.651	.273	78.8	82.9	72.5	10.4
3	.804	.916	.631	.285	78.2	82.6	72.5	10.1
4	.798	.916	.639	.277	77.9	82.6	72.1	10.5
5	.810	.928	.651	.277	77.6	82.5	72.0	10.5
6	.828	.942	.670	.272	77.3	81.5	71.5	10.0
7	.849	.968	.697	.271	78.2	83.0	72.0	11.0
8	.871	.984	.714	.270	80.4	84.5	72.0	12.5
9	.885	30.005	.730	.275	82.3	87.0	72.2	14.8
10	.884	29.999	.742	.257	83.9	87.8	72.2	15.6
11	.867	.985	.734	.251	85.0	90.0	72.7	17.3
Noon.	.844	.967	.709	.253	85.2	90.6	72.2	18.4
1	.815	.936	.690	.246	85.7	91.2	72.0	19.2
2	.792	.911	.663	.243	85.7	91.3	72.0	19.3
3	.778	.905	.644	.261	85.6	90.8	72.8	18.0
4	.774	.901	.623	.278	84.7	91.2	73.0	18.2
5	.783	.907	.631	.273	84.0	89.5	73.5	16.0
6	.794	.914	.648	.266	82.5	87.5	74.0	13.5
7	.814	.929	.675	.254	81.6	86.5	74.4	12.1
8	.834	.949	.684	.265	80.9	86.0	74.0	12.0
9	.847	.965	.712	.253	80.3	84.5	74.0	10.5
10	.852	.977	.723	.254	79.8	83.2	73.7	9.5
11	.849	.961	.714	.247	79.5	83.0	74.0	9.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb-  
Thermometer Means are derived from the observations made at the several  
hours during the month.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	77.3	2.0	75.9	3.4	.0879	9.51	1.08	.90
1	77.0	1.9	75.7	3.2	.873	.45	.02	.90
2	76.8	1.8	75.5	3.1	.868	.40	0.98	.91
3	76.5	1.7	75.3	2.9	.862	.34	.91	.91
4	76.2	1.7	75.0	2.9	.854	.25	.91	.91
5	76.1	1.5	75.0	2.6	.854	.25	.82	.92
6	75.9	1.4	74.9	2.4	.851	.24	.74	.93
7	76.4	1.8	75.1	3.1	.857	.28	.97	.91
8	77.2	3.2	75.0	5.4	.854	.22	1.72	.84
9	77.9	4.4	74.8	7.5	.840	.13	2.45	.79
10	78.3	5.6	74.4	9.5	.838	8.97	3.16	.74
11	78.3	6.7	73.6	11.4	.817	.73	.80	.70
Noon.	78.1	7.1	73.1	12.1	.803	.58	4.03	.68
1	78.2	7.5	72.9	12.8	.797	.50	.30	.66
2	78.2	7.5	72.9	12.8	.797	.50	.30	.66
3	78.2	7.4	73.0	12.6	.801	.53	.23	.67
4	77.8	6.9	73.0	11.7	.801	.55	3.87	.69
5	77.9	6.1	73.6	10.4	.817	.75	.42	.72
6	78.5	4.0	75.7	6.8	.873	9.38	2.26	.81
7	78.4	3.2	76.2	5.4	.887	.56	1.78	.84
8	78.1	2.8	76.1	4.8	.885	.53	.57	.86
9	77.7	2.6	75.9	4.4	.879	.40	.42	.87
10	77.3	2.5	75.5	4.3	.868	.38	.37	.87
11	77.3	2.2	75.8	3.7	.876	.46	.20	.89

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
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in the month of October 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	inches		lb	Miles	
1	142.0	0.16	S by W & SE	...	62.6	S to 5 A. M. \i to 10 A. M. \i to 7 P. M. \i to 11 P. M. T from 12 A. M. to 3 P. M. L from 7 to 11 P. M. R between 11 & 12 A. M.
2	140.0	0.29	SSW & variable	0.2	20.4	S to 5 A. M. \i to 1 P. M. O to 4 P. M. S to 9 P. M. B to 11 P. M. Slightly foggy from 5 to 7 A. M. T from 12 A. M. to 4 P. M. L from midnight to 4 A. M. & at 7 P. M. R from 1 to 3 P. M.
3	147.0	0.73	SSW & S by W	0.7	16.2	B to 6 A. M. \i to 11 P. M. Foggy between 6 & 7 A. M. T at 10 P. M. R at 5 & 10 P. M.
4	141.6	...	NNE & N	...	23.2	Chiefly \i D between 11 & 12 A. M.
5	138.5	0.16	S by W	...	8.8	B to 4 A. M. \i to 8 P. M. B to 11 P. M. T at 12½ A. M. & from 3½ to 6 P. M. R bet- ween 3 & 4 P. M.
6	145.0	...	SSW & ESE	...	23.5	B to 4 A. M. \i to 6 P. M B to 11 P. M.
7	148.8	0.16	SE & variable	...	9.0	B to 7 A. M. \i to 11 P. M. T at 11½ A. M. L from 6 to 10 P. M. R at 12 A. M.
8	141.4	...	NW & variable	...	51.1	S to 2 A. M. B to 5 A. M. \i to 10 A. M. \i to 4 P. M. S to 11 P. M. T from 9 to 11 P. M. L from 7 to 11 P. M.
9	136.3	1.90	NNE	...	81.9	\i to 5 A. M. O to 8 A. M. \i to 11 P. M. L at midnight R from 4 to 8 A. M.
10	140.0	...	N & ENE	...	47.7	O to 3 A. M. B to 11 P. M.
11	140.2	...	ENE & E by N	...	42.5	B to 1 P. M. \i to 5 P. M. B to 11 P. M.
12	141.0	...	E by N	...	38.8	B to 9 A. M. \i to 3 P. M. \i to 9 P. M. B to 11 P. M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning,  
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1872.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Miles	
13	122.0	0.04	E by N & SE	...	41.3	B to 2 A. M. \i to 12 A. M. clouds of different kinds to 11 P. M. Light R at 1½ & 7 P. M. i to 4 A. M. O to 11 P. M. D at 7 A. M.
14	123.6	...	SSE & SW	...	52.4	O to 8 A. M. S to 4 P. M. O to 7 P. M. S to 11 P. M. Slight R from 5 to 7 A. M. & between 5 & 6 P. M.
15	140.7	0.14	SSE & ENE	...	51.5	\i to 8 A. M. \i to 7 P. M. B to 11 P. M.
16	146.3	...	NNE & ENE	...	72.6	\i to 10 A. M. \i to 3 P. M. \i to 5 P. M. B to 11 P. M. Slightly foggy at 10 & 11 P. M.
17	146.0	...	ESE, NE & ENE	...	60.6	B to 9 A. M. \i to 5 P. M. B to 11 P. M. Foggy from midnight to 5 A. M. & at 10 & 11 P. M.
18	138.4	...	ENE	...	16.3	B to 10 A. M. \i to 4 P. M. B to 11 P. M., Slightly foggy at midnight & 1 A. M. & from 9 to 11 P. M.
19	146.8	...	ENE	...	42.1	B to 9 A. M. \i to 2 P. M. \i to 4 P. M. B to 11 P. M. Slightly foggy from midnight to 2 A. M. & between 7 & 8 P. M.
20	145.0	...	ENE & NE	...	51.2	B to 3 A. M. \i to 7 A. M. B to 9 A. M. \i to 3 P. M. B to 11 P. M.
21	145.0	...	NE & ENE	...	88.4	B. B to 4 A. M. \i to 6 P. M. B to 11 P. M.
22	143.8	...	NE, ENE & NNW	...	123.1	\i to 4 A. M. S to 6 A. M. O to 11 P. M. Brisk wind bet- ween 11 & 12 A. M. T at 12 A. M., Slight R at 7½ & from 11 A. M. to 11 P. M.
23	142.5	...	N by E & ENE	...	122.5	
24	...	1.18	ENE, SSE & E by S	2.0	115.0	

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi,  
\i Cirro-cumuli, B clear, S straton, O overcast, T thunder, L lightning  
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1872.*

Solar Radiation, Weather, &c..

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles.	
25	...	3.90	E N E & N E	2.0	261.5	O Brisk wind from 5 A. M. to 4½ P. M. R whole day.
26	135.0	0.27	S E & S	3.8	319.5	O to 7 A. M. Ci to 7 P. M. B to 11 P. M. Brisk wind from 8½ A. M. to 2½ P. M., Slight R after intervals
27	131.2	...	S S W & N W	...	108.6	B to 5 A. M. \i to 8 A. M. \i to 1 P. M. \i to 4 P. M. \i to 8 P. M. S to 11 P. M.
28	137.0	...	N & N N W	...	35.7	O to 10 A. M. Ci & \i to 11 P. M.
29	140.0	...	NNW, NW & W	...	40.0	S to 1 A. M. B to 5 A. M. \i to 11 A. M. \i to 4 P. M. B to 11 P. M.
30	141.0	...	W by N, W & SW	...	19.7	B to 10 A. M. Ci to 3 P. M. \i to 6 P. M. B to 11 P. M.
31	139.0	...	S W & N W	...	22.8	Chiefly B.

\i Cirri — i Strati, Ci Cumuli, \i Cirro-strati, ~i Cumulo-strati ~i Nimbi  
\i Cirro-Cumuli, B clear, S straton, O overcast, T thunder, L lightning,  
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of October 1872.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ... ..	29.827
Max. height of the Barometer occurred at 9 A. M. on the 21st ...	30.005
Min. height of the Barometer occurred at 4 P. M. on the 1st. ...	29.623
Extreme range of the Barometer during the month ... ..	0.382
Mean of the daily Max. Pressures ... ..	29.890
Ditto ditto Min. ditto ... ..	29.769
Mean daily range of the Barometer during the month ... ..	0.121

	°
Mean Dry Bulb Thermometer for the month ... ..	81.4
Max. Temperature occurred at 2 P. M. on the 6th ... ..	91.3
Min. Temperature occurred at 6 A. M. on the 25th ... ..	71.5
Extreme range of the Temperature during the month ... ..	19.8
Mean of the daily Max. Temperature ... ..	86.8
Ditto ditto Min. ditto, ... ..	77.1
Mean daily range of the Temperature during the month ... ..	9.7

Mean Wet Bulb Thermometer for the month ... ..	77.5
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	3.9
Computed Mean Dew-point for the month ... ..	74.8
Mean Dry Bulb Thermometer above computed mean Dew-point ...	6.6

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.849

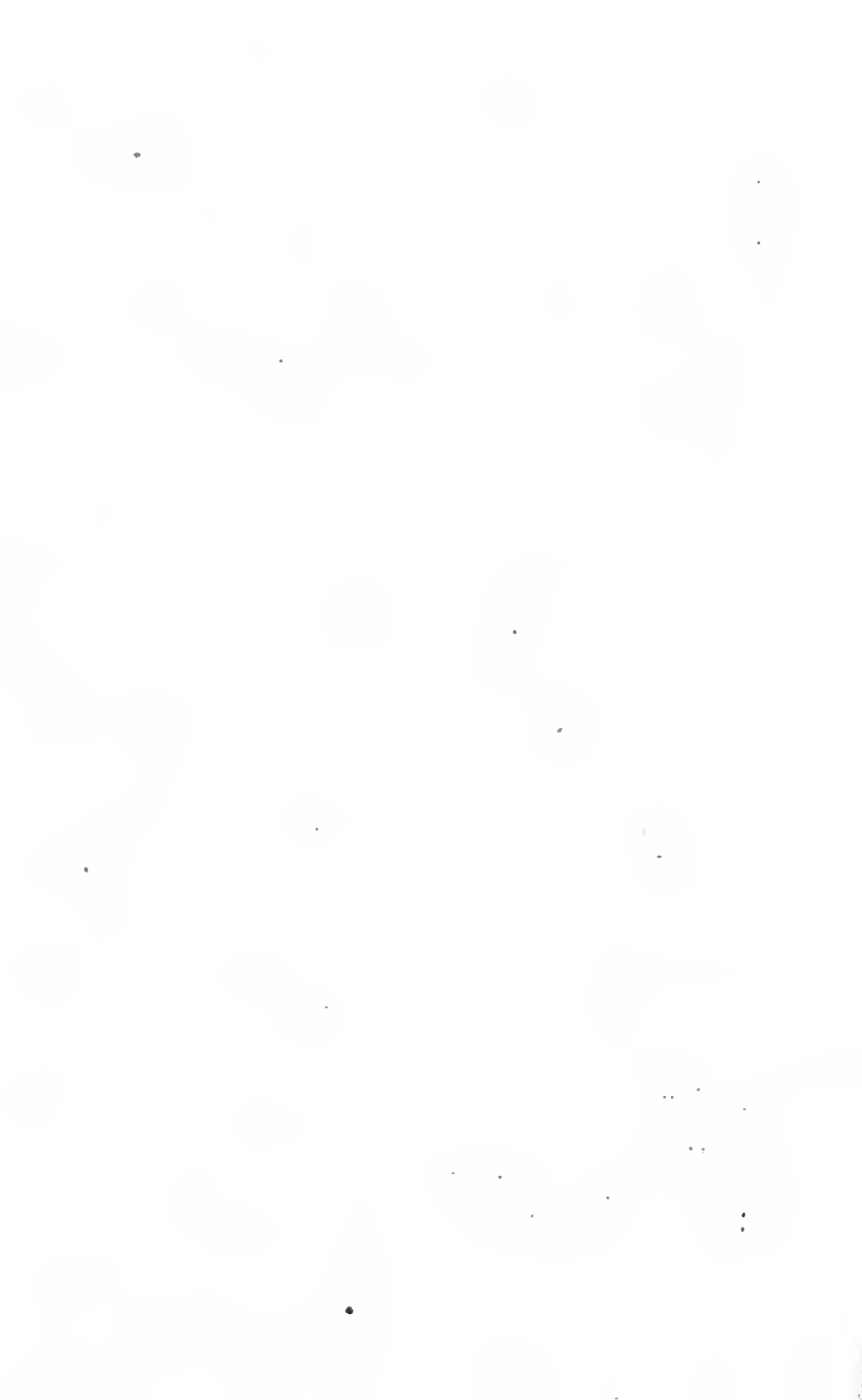
	Troy grain.
Mean Weight of Vapour for the month ... ..	9.13
Additional Weight of Vapour required for complete saturation ...	2.14
Mean degree of humidity for the month, complete saturation being unity	0.81

	°
Mean Max. Solar radiation Thermometer for the month ... ..	140.1

	Inches.
Rained 13 days,—Max. fall of rain during 24 hours ... ..	3.90
Total amount of rain during the month ... ..	8.93
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... ..	7.89
Prevailing direction of the Wind ... ..	E. N. E. & N. E.

\* Height 70 feet 10 inches above ground.





*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1872.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
1	29.946	30.008	29.898	0.110	79.6	84.5	75.5	9.0
2	.915	.001	.897	.104	79.0	85.0	73.6	11.4
3	.973	.015	.928	.122	78.4	85.2	73.2	12.0
4	.971	.021	.927	.094	77.8	84.2	72.0	12.2
5	.917	.011	.897	.114	79.0	85.6	73.3	12.3
6	.960	.015	.917	.098	80.6	88.0	74.5	13.5
7	.911	.022	.875	.147	80.8	87.5	74.5	13.0
8	.922	29.990	.870	.120	80.1	87.2	74.0	13.2
9	.957	30.027	.886	.141	79.2	86.3	73.1	13.2
10	.983	.061	.935	.126	76.9	83.6	71.8	11.8
11	.950	.024	.887	.137	75.0	83.0	67.5	15.5
12	.939	29.995	.882	.113	77.8	86.5	70.5	16.0
13	.934	30.000	.867	.139	80.2	87.6	74.2	13.4
14	.914	29.973	.871	.102	80.0	86.7	74.0	12.7
15	.930	.995	.885	.110	78.2	85.0	73.0	12.0
16	.932	.997	.872	.125	75.3	81.4	70.0	11.4
17	.946	30.022	.888	.134	73.9	81.5	67.5	14.0
18	.908	29.981	.840	.141	73.7	83.0	68.0	15.0
19	.955	30.029	.898	.131	74.2	82.0	67.5	14.5
20	.977	.051	.907	.144	74.7	82.8	68.5	14.3
21	.971	.047	.915	.132	75.1	83.2	69.3	13.9
22	.928	.004	.883	.121	75.2	82.3	69.4	12.9
23	.877	29.949	.813	.136	75.8	83.4	69.5	13.9
24	.905	.980	.833	.147	75.1	82.8	68.5	14.3
25	.974	30.043	.927	.116	74.5	82.2	68.6	13.6
26	.962	.043	.902	.141	70.9	79.4	64.0	15.4
27	.912	.018	.883	.135	70.9	79.9	63.2	16.7
28	.918	.006	.896	.110	71.2	80.0	64.5	15.5
29	.928	29.985	.863	.122	72.6	80.9	65.0	15.9
30	.960	30.020	.917	.103	74.2	81.0	69.6	11.4

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1872.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- moneter.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satu- ration being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
1	75.0	4.6	71.8	7.8	0.771	8.31	2.38	0.78
2	73.0	6.0	68.8	10.2	.699	7.56	.94	.72
3	72.0	6.4	67.5	10.9	.670	.26	3.05	.70
4	73.0	4.8	69.6	8.2	.717	.77	2.36	.77
5	74.2	4.8	70.8	8.2	.746	8.07	.43	.77
6	75.3	5.3	71.6	9.0	.766	.25	.76	.75
7	75.1	5.7	71.1	9.7	.753	.11	.96	.73
8	74.2	5.9	70.1	10.0	.729	7.87	.97	.73
9	72.7	6.5	68.1	11.1	.684	.33	3.18	.70
10	69.3	7.6	64.0	12.9	.597	6.48	.39	.66
11	68.7	6.3	64.3	10.7	.603	.57	2.74	.71
12	72.9	4.9	69.5	8.3	.715	7.75	.38	.77
13	75.4	4.8	72.0	8.2	.776	8.26	.52	.77
14	74.9	5.1	71.3	8.7	.758	.18	.63	.76
15	72.9	5.3	69.2	9.0	.703	7.67	.53	.75
16	69.4	5.9	65.3	10.0	.623	6.79	.61	.72
17	68.1	5.8	64.0	9.9	.597	.52	.49	.72
18	68.0	5.7	64.0	9.7	.597	.52	.44	.73
19	68.7	5.5	64.8	9.4	.613	.71	.38	.74
20	69.2	5.5	65.3	9.1	.623	.81	.42	.74
21	69.8	5.3	66.1	9.0	.610	.97	.37	.75
22	70.4	4.8	67.0	8.2	.659	7.18	.19	.77
23	70.4	5.4	66.6	9.2	.651	.08	.46	.74
24	69.6	5.5	65.7	9.4	.632	6.89	.45	.74
25	68.1	6.4	63.6	10.9	.590	.43	.75	.70
26	63.2	7.7	57.0	13.9	.473	5.19	3.04	.63
27	64.5	6.4	59.4	11.5	.513	.62	2.61	.68
28	64.9	6.3	59.9	11.3	.521	.72	.53	.69
29	66.2	6.4	61.1	11.5	.543	.93	.73	.69
30	69.0	5.2	65.4	8.8	.626	6.82	.27	.75

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.948	29.991	29.851	0.140	73.3	78.0	67.0	11.0
1	.938	.984	.844	.140	72.7	77.5	66.4	11.1
2	.929	.977	.835	.142	72.2	77.0	66.0	11.0
3	.920	.971	.833	.138	71.7	76.5	65.4	11.1
4	.919	.968	.810	.128	71.7	76.0	64.8	11.2
5	.932	.982	.856	.126	70.7	75.6	64.0	11.6
6	.949	30.003	.882	.121	70.3	75.5	63.2	12.3
7	.967	.020	.895	.125	70.6	76.0	63.5	12.5
8	.992	.045	.924	.111	73.6	79.0	66.0	13.0
9	30.011	.061	.949	.112	76.7	81.3	69.0	12.3
10	.008	.054	.943	.111	79.1	84.2	72.5	11.7
11	29.989	.040	.924	.116	80.9	86.0	75.3	10.7
Noon.	.962	.009	.886	.123	81.9	86.6	77.0	9.6
1	.929	29.978	.857	.121	82.8	87.6	78.4	9.2
2	.908	.954	.830	.124	83.4	87.3	79.4	7.9
3	.895	.943	.818	.125	83.2	88.0	78.8	9.2
4	.892	.935	.813	.122	81.9	86.3	77.3	9.0
5	.902	.943	.822	.121	80.7	85.2	76.0	9.2
6	.914	.948	.810	.108	78.5	83.0	73.0	10.0
7	.931	.974	.851	.123	77.1	81.5	71.4	10.1
8	.948	.982	.866	.116	76.1	80.5	70.5	10.0
9	.958	.993	.872	.121	75.2	80.0	69.5	10.5
10	.972	.994	.879	.124	74.5	79.4	68.3	11.1
11	.959	30.002	.859	.143	73.8	79.0	68.0	11.0

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	70.0	3.3	67.4	5.9	.668	7.39	1.51	0.83
1	69.5	3.2	66.9	5.8	.657	.19	.49	.83
2	69.1	3.1	66.6	5.6	.651	.12	.43	.83
3	68.7	3.0	66.3	5.4	.644	.08	.35	.84
4	68.3	2.8	66.1	5.0	.640	.03	.25	.85
5	68.0	2.7	65.8	4.9	.634	6.97	.21	.85
6	67.7	2.6	65.6	4.7	.630	.93	.15	.86
7	67.9	2.7	65.7	4.9	.632	.95	.20	.85
8	69.4	4.2	66.5	7.1	.618	7.09	.84	.79
9	70.6	6.1	66.3	10.4	.614	.01	2.79	.72
10	71.6	7.5	66.3	12.8	.614	6.96	3.57	.66
11	72.0	8.9	65.8	15.1	.634	.83	4.27	.62
Noon.	71.9	10.0	64.9	17.0	.615	.62	.82	.58
1	72.3	10.5	64.9	17.9	.615	.60	5.15	.56
2	72.4	11.0	64.7	18.7	.611	.51	.42	.55
3	72.3	10.9	64.7	18.5	.611	.51	.35	.55
4	71.7	10.2	64.6	17.3	.609	.55	4.89	.57
5	72.0	8.7	65.9	14.8	.636	.85	.19	.62
6	72.5	6.0	68.3	10.2	.688	7.45	2.90	.72
7	72.2	4.9	68.8	8.3	.699	.59	.33	.77
8	71.8	4.3	68.8	7.3	.699	.60	.03	.79
9	71.4	3.8	68.7	6.5	.697	.58	1.79	.81
10	70.9	3.6	68.4	6.1	.690	.53	.65	.82
11	70.3	3.5	67.8	6.0	.677	.39	.59	.82

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure.	Daily Velocity.	
	°	Inches		lb	Miles	
1	141.0	...	N W & N by E	...	7.8	B to 10 A. "i to 4 P. M. B to 11 P. M.
2	137.5	...	N & N by W	...	19.5	B to 9 A. M., "i to 1 P. M. B to 11 P. M.
3	142.4	...	N by W	...	32.9	B to 4 A. M., "i to 8 A. M. B to 11 P. M.
4	135.0	...	N by W & N N W	...	54.8	B to 9 A. M., "i to 3 P. M. B to 11 P. M.
5	148.5	...	NNW & E N E	...	102.2	B to 10 A. M., "i to 4 P. M. B to 11 P. M.
6	...	...	E N E & N N W	...	70.3	B to 11 A. M., "i to 3 P. M. B to 11 P. M.
7	...	...	N & N by E	...	105.1	B to 4 A. M., "i to 7 A. M. B to 11 A. M., "i to 4 P. M. B to 11 P. M.
8	...	...	N by E, E N E & N E	0.1	67.6	B to 12 A. M., "i & "i to 4 P. M. B to 11 P. M.
9	...	...	N E & N	0.1	72.9	B.
10	...	...	N N E & N	1.0	118.2	B. Brisk wind from 12½ A. M. to 2½ P. M.
11	...	...	N & N by W	...	203.9	B to 11 A. M., "i to 7 P. M. B to 11 P. M.
12	132.0	...	N by W & N E	...	92.0	B.
13	142.5	...	N E & E by N	...	82.5	B to 10 A. M., "i to 5 P. M. B to 7 P. M., "i to 11 P. M.
14	142.3	...	E by N & N	...	81.0	B. to 10 A. M., "i to 4 P. M. B to 6 P. M., "i to 11 P. M.
15	141.5	...	N N E, E N E & N	...	108.0	"i to 7 A. M. B to 11 A. M. "i to 5 P. M. B to 9 P. M., "i to 11 P. M.
16	139.5	...	N by E & N [N W	...	82.2	B.
17	139.0	...	N by E, N N W &	...	70.8	B.
18	140.2	...	N W	...	83.4	B to 10 A. M., clouds of different kinds to 5 P. M. B to 11 P. M.
19	137.0	...	W by N & W N W	...	33.7	B to 6 A. M., "i to 6 P. M. B to 11 P. M. Slightly foggy from 7 to 9 P. M.

"i Cirri,—i Strati, "i Cumuli, "i Cirro-strati, "i Cumulo-strati, "i Nimbi, "i Cirro-cumuli, B clear, S stratoni, O overcast, T thunder, L lightning, R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1872.*

## Solar Radiation, Weather, &amp;c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles	
20	139.5	...	W & N E	...	34.7	B to 4 A. M., \i to 8 A. M. B to 10 A. M., \i to 5 P. M. B to 11 P. M.
21	135.0	...	N E & N	...	40.7	B to 10 A. M., \i to 4 P. M. B to 11 P. M.
22	125.0	...	N E & W N W	...	23.7	B to 3 A. M., \i to 7 P. M. S to 11 P. M.
23	139.7	...	N by W & N W	...	37.3	S to 7 A. M., \i to 9 A. M. B to 2 P. M., \i to 6 P. M. B to 11 P. M. Slightly foggy at 10 & 11 P. M.
24	137.0	...	N & W by N	...	6.2	B to 7 A. M., \i to 11 P. M.
25	136.0	...	N W & N N E	...	64.8	B to 4 A. M., \i to 10 A. M. \i to 1 P. M. B to 11 P. M.
26	136.8	...	NW & NNW \ W	...	83.0	B.
27	134.5	...	NW, NNE & NN	...	56.2	B to 1 P. M., \i to 5 P. M. B to 11 P. M.
28	138.0	...	N by E & N E	...	77.3	B to 4 A. M., \i to 11 P. M. Slightly foggy at 7 & 8 P. M.
29	138.0	...	N E & E N E	...	115.7	B to 5 A. M. S to 7 A. M., \i to 12 A. M., \i to 4 P. M. S to 11 P. M.
30	122.5	0.02	N E & E N E	...	100.4	O to 9 A. M. S to 6 P. M. O to 11 P. M. Light R at 3 & 11 A. M.

\i Cirri,—i Strati, \i Cumuli, \i Cirro-strati, \i Cumulo-strati, \i Nimbi, \i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of November 1872.*

MONTHLY RESULTS.

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	Inches.
Mean height of the Barometer for the month ... ..	29.994
Max. height of the Barometer occurred at 9 A. M. on the 10th ...	30.061
Min. height of the Barometer occurred at 4 P. M. on the 23rd. ...	29.813
Extreme range of the Barometer during the month ... ..	0.248
Mean of the daily Max. Pressures ... ..	30.012
Ditto ditto Min. ditto ... ..	29.888
Mean daily range of the Barometer during the month ... ..	0.124

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	°
Mean Dry Bulb Thermometer for the month ... ..	76.3
Max. Temperature occurred at 1 P. M. on the 13th ... ..	87.6
Min. Temperature occurred at 6 A. M. on the 27th ... ..	63.2
Extreme range of the Temperature during the month ... ..	24.4
Mean of the daily Max. Temperature ... ..	83.7
Ditto ditto Min. ditto, ... ..	70.3
Mean daily range of the Temperature during the month ... ..	13.4

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Mean Wet Bulb Thermometer for the month ... ..	70.6
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	5.7
Computed Mean Dew-point for the month ... ..	66.6
Mean Dry Bulb Thermometer above computed mean Dew-point ...	9.7

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.651

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	Troy grain.
Mean Weight of Vapour for the month ... ..	7.07
Additional Weight of Vapour required for complete saturation ...	2.62
Mean degree of humidity for the month, complete saturation being unity	0.73

	°
Mean Max. Solar radiation Thermometer for the month ... ..	137.5

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	Inches.
Rained 1 day,—Max. fall of rain during 24 hours ... ..	0.02
Total amount of rain during the month ... ..	0.02
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... ..	Nil
Prevailing direction of the Wind ... ..	N. E, N. & N. W.

\* Height 70 feet 10 inches above ground.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1872.*

Latitude  $22^{\circ} 33' 1''$  North. Longitude  $88^{\circ} 20' 34''$  East.

Height of the Cistern of the Standard Barometer above the sea level, 18.11 feet.

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Date.	Mean Height of the Barometer at $32^{\circ}$ Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.982	30.051	29.941	0.113	75.7	82.2	70.5	11.7
2	.919	.001	.844	.157	77.2	82.0	73.5	8.5
3	.831	29.890	.766	.124	77.9	83.7	75.0	8.7
4	.846	.904	.796	.108	74.0	77.2	71.3	5.9
5	.940	30.006	.876	.130	73.8	81.0	69.5	11.5
6	.998	.082	.953	.129	71.4	78.0	65.4	12.6
7	.977	.058	.925	.133	70.5	79.0	63.7	15.3
8	.968	.044	.914	.130	71.3	79.3	65.0	14.3
9	.983	.059	.930	.129	68.8	76.4	61.5	14.9
10	.971	.050	.914	.136	66.8	76.2	59.0	17.2
11	.948	.028	.894	.134	69.6	78.0	62.7	15.3
12	.951	.022	.901	.121	70.0	78.0	62.8	15.2
13	.952	.027	.892	.135	69.7	77.5	63.0	14.5
14	.968	.040	.915	.125	69.1	77.0	62.0	15.0
15	.990	.053	.937	.116	69.1	78.0	61.9	16.1
16	30.041	.115	.984	.131	69.8	79.0	62.6	16.4
17	.091	.166	30.039	.127	69.8	78.0	63.0	15.0
18	.049	.110	29.979	.140	70.4	79.5	63.0	16.5
19	.018	.087	.956	.131	70.9	80.0	64.3	15.7
20	.021	.094	.976	.118	71.1	80.5	63.5	17.0
21	.009	.087	.941	.146	70.7	80.0	63.5	16.5
22	29.979	.055	.924	.131	69.1	78.4	61.8	16.6
23	.977	.064	.924	.140	69.4	78.6	62.3	16.3
24	.985	.049	.939	.110	69.6	78.0	63.0	15.0
25	30.043	.125	.973	.152	68.1	76.5	61.5	15.0
26	.091	.186	30.031	.155	66.7	75.5	58.8	16.7
27	.009	.102	29.922	.180	67.3	76.9	59.5	17.4
28	29.948	.022	.897	.125	65.8	75.2	59.0	16.2
29	.952	.035	.890	.145	65.6	75.4	58.0	17.4
30	.926	.004	.866	.138	65.5	75.0	58.0	17.0
31	.924	29.991	.878	.113	65.3	75.0	57.4	17.6

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb Thermometer Means are derived, from the hourly observations, made at the several hours during the day.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1872.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

Date.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity: complete satu- ration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	71.5	4.2	68.6	7.1	0.695	7.56	1.95	0.80
2	73.8	3.4	71.4	5.8	.761	8.25	.70	.83
3	75.2	2.7	73.3	4.6	.809	.75	.41	.86
4	70.9	3.1	68.7	5.3	.697	7.61	.43	.84
5	68.5	5.3	64.8	9.0	.613	6.71	2.27	.75
6	65.2	6.2	60.2	11.2	.527	5.78	.57	.69
7	64.8	5.7	60.2	10.3	.527	.79	.34	.71
8	65.8	5.5	61.4	9.9	.548	6.02	.31	.72
9	61.3	7.5	55.3	13.5	.447	4.93	.78	.64
10	60.3	6.5	55.1	11.7	.444	.92	.34	.68
11	63.4	6.2	58.4	11.2	.496	5.40	.44	.69
12	64.4	5.6	59.9	10.1	.521	.73	.27	.72
13	64.2	5.5	59.8	9.9	.520	.71	.22	.72
14	63.6	5.5	59.2	9.9	.509	.62	.16	.72
15	63.9	5.2	59.7	9.4	.518	.72	.06	.74
16	64.9	4.9	61.0	8.8	.541	.95	.00	.75
17	65.3	4.5	61.7	8.1	.554	6.09	1.86	.77
18	65.8	4.6	62.1	8.3	.561	.17	.93	.76
19	66.2	4.7	62.4	8.5	.567	.22	2.01	.76
20	65.8	5.3	61.6	9.5	.552	.05	.23	.73
21	64.4	6.3	59.4	11.3	.513	5.63	.55	.69
22	64.0	5.1	59.9	9.2	.521	.74	.04	.74
23	64.2	5.2	60.0	9.4	.523	.76	.10	.73
24	64.5	5.1	60.4	9.2	.530	.84	.06	.74
25	62.2	5.9	57.5	10.6	.481	.31	.24	.70
26	60.9	5.8	56.3	10.4	.462	.13	.10	.71
27	61.8	5.5	57.4	9.9	.480	.30	.07	.72
28	60.8	5.0	56.8	9.0	.470	.21	1.83	.74
29	60.3	5.3	56.1	9.5	.459	.10	.90	.73
30	60.0	5.5	55.6	9.9	.452	.02	.96	.72
31	60.2	5.1	56.1	9.2	.459	.11	.82	.74

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Tempera- ture for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	°	°	°	°
Mid- night.	29.979	30.096	29.815	0.281	67.1	75.8	61.4	14.4
1	.971	.087	.809	.278	66.4	75.8	60.5	15.3
2	.962	.069	.803	.266	65.7	75.6	59.8	15.8
3	.953	.066	.796	.270	65.0	75.6	59.0	16.6
4	.951	.064	.801	.263	64.4	75.5	58.6	16.9
5	.963	.081	.811	.270	64.0	75.8	58.0	17.8
6	.981	.100	.833	.267	63.6	76.0	57.4	18.6
7	30.002	.126	.845	.281	63.5	76.3	57.4	18.9
8	.029	.159	.873	.286	65.4	76.5	59.5	17.0
9	.050	.181	.890	.291	68.6	77.0	63.5	13.5
10	.050	.186	.886	.300	71.8	79.5	66.2	13.3
11	.030	.159	.872	.287	74.6	81.5	70.0	11.5
Noon.	29.998	.128	.838	.290	76.3	83.0	70.9	12.1
1	.966	.094	.809	.285	77.3	82.0	73.2	8.8
2	.941	.056	.785	.271	78.1	83.7	74.3	9.4
3	.928	.039	.769	.270	77.9	82.0	74.7	7.3
4	.925	.043	.766	.277	76.7	81.6	73.2	8.4
5	.933	.059	.781	.278	75.3	80.8	71.9	8.9
6	.944	.071	.795	.276	72.7	79.2	68.5	10.7
7	.960	.082	.813	.269	71.2	78.6	66.9	11.7
8	.974	.093	.824	.269	70.1	78.5	65.2	13.3
9	.985	.102	.836	.266	69.0	76.9	64.3	12.6
10	.988	.099	.829	.270	68.2	76.4	63.0	13.4
11	.985	.101	.837	.264	67.5	76.0	62.5	13.5

The Mean Height of the Barometer, as likewise the Dry and Wet Bulb  
Thermometer Means are derived from the observations made at the several  
hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1872.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued).

Hour.	Mean Wet Bulb Ther- mometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a Cubic foot of air.	Additional Weight of Vapour required for complete saturation.	Mean degree of Humi- dity, complete satura- tion being unity.
	°	°	°	°	Inches.	T. gr.	T. gr.	
Mid- night.	64.0	3.1	61.5	5.6	0.550	6.09	1.23	0.83
1	63.5	2.9	61.2	5.2	.544	.04	.13	.84
2	63.0	2.7	60.8	4.9	.537	5.96	.06	.85
3	62.4	2.6	60.3	4.7	.528	.87	.00	.85
4	61.9	2.5	59.6	4.8	.516	.74	.00	.85
5	61.6	2.4	59.4	4.6	.513	.70	0.95	.86
6	61.3	2.3	59.2	4.4	.509	.68	.89	.87
7	61.2	2.3	59.1	4.4	.508	.66	.89	.86
8	62.4	3.0	60.0	5.4	.523	.81	1.14	.84
9	63.9	4.7	60.1	8.5	.525	.78	.89	.75
10	65.4	6.4	60.3	11.5	.528	.79	2.66	.69
11	66.6	8.9	61.0	13.6	.541	.89	3.31	.64
Noon.	67.1	9.2	60.7	15.6	.536	.81	.88	.60
1	67.3	10.0	60.3	17.0	.528	.73	4.25	.57
2	67.6	10.5	60.2	17.9	.527	.70	.52	.56
3	67.4	10.5	60.0	17.9	.523	.66	.50	.56
4	66.9	9.8	60.0	16.7	.523	.67	.13	.58
5	67.1	8.2	61.4	13.9	.548	.97	3.43	.64
6	67.3	5.4	63.0	9.7	.578	6.32	2.36	.73
7	66.7	4.5	63.1	8.1	.580	.37	1.93	.77
8	65.9	4.2	62.5	7.6	.568	.25	.78	.78
9	65.2	3.8	62.2	6.8	.563	.20	.56	.80
10	64.7	3.5	61.9	6.3	.557	.16	.42	.81
11	64.2	3.3	61.6	5.9	.552	.10	.32	.82

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles	
1	139.0	...	E N E	...	107.9	~i to 4 A. M., ~i to 6 P. M. B to 11 P. M. Slightly foggy from 9 to 11 P. M.
2	135.0	...	E N E, E by N & S by E	...	12.7	B to 3 A. M., ~i to 4 P. M. S to 8 P. M. B to 11 P. M. Slightly foggy at midnight & 1 A. M. D at 7 A. M.
3	141.0	0.03	S by E & N E	...	26.2	~i to 2 A. M. O to 9 A. M., ~i to 7 P. M. O to 11 P. M. Light R at 5 A. M., 3 & 4½ P. M.
4	134.5	0.06	N E	...	150.3	O to 10 A. M., ~i to 1 P. M. O to 7 P. M. B to 11 P. M. Light R at 2½, 3, 4 & between 8 & 9 A. M.
5	135.6	...	N E	...	92.4	B to 3 A. M., ~i to 8 A. M. B to 11 P. M. Slightly foggy at 8, 10 & 11 P. M.
6	133.4	...	N E & N N W	...	43.4	B to 6 A. M., ~i to 5 P. M., ~i & ~i to 9 P. M. B to 11 P. M. Slightly foggy at midnight.
7	135.7	...	N W & N N W	...	44.7	B to 5 A. M., ~i to 9 A. M. B to 11 P. M. Slightly foggy at 8 & 9 P. M.
8	134.0	...	N E	...	20.8	B to 5 A. M., ~i to 7 A. M., ~i to 9 A. M. B to 5 P. M., ~i to 11 P. M.
9	134.0	...	N E & N W	...	20.6	~i & ~i to 2 A. M. B to 11 P. M.
10	131.8	...	N W & N N W	...	93.8	Chiefly B.
11	133.6	...	N by W & N E	...	140.0	~i to 8 A. M. B to 12 A. M., ~i & ~i to 4 P. M., ~i to 11 P. M.
12	132.0	...	N E	...	120.6	~i to 1 A. M. B to 12 A. M., ~i to 6 P. M., ~i to 11 P. M.
13	133.0	...	N E	...	83.0	~i to 1 A. M. B to 12 A. M., ~i & ~i to 6 P. M. B to 11 P. M.
14	134.2	...	N E	...	46.0	B to 11 A. M., ~i to 3 P. M. B to 11 P. M.

~i Cirri,—i Strati, ~i Cumuli, ~i Cirro-strati, ~i Cumulo-strati, ~i Nimbi,  
~i Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning,  
R rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1872.*

Solar Radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain Gauge 1½ ft. above Ground.	WIND.			General aspect of the Sky.
			Prevailing direction.	Max. Pressure	Daily Velocity.	
	°	Inches		lb	Miles	
15	132.0	...	N E	...	58.0	B.
16	131.8	...	N E	...	67.6	B to 11 A. M., ☿ to 4 P. M. B to 7 P. M., ☿ & ☿ to 9 P. M., B to 11 P. M.
17	131.0	...	N E	...	39.7	B to 11 A. M., ☿ to 4 P. M., B to 11 P. M., Slightly foggy at 8 & 9 P. M.
18	136.2	...	E N E & W N W	...	25.5	Chiefly B Slightly foggy from 5 to 8 A. M.
19	130.8	...	W N W & N N E	...	65.2	B to 3 P. M., ☿ to 6 P. M. B to 11 P. M. Slightly foggy at 10 & 11 P. M.
20	134.8	...	N N E & N W (W	...	64.3	B. Slightly foggy at midnight.
21	135.5	...	N W, N N W & W N	...	56.2	B to 1 P. M. ☿ to 6 P. M. B to 11 P. M. Slightly foggy at 11 P. M.
22	130.0	...	W N W, N N W & N	...	76.1	B to 5 A. M. ☿ to 6 P. M. B to 11 P. M. Slightly foggy from 9 to 11 P. M.
23	131.3	...	N E & N W	...	50.4	B to 7 P. M. ☿ to 11 P. M. Slightly foggy from midnight to 2 P. M. & 7 to 10 P. M.
24	130.5	...	N E & E by N	...	51.4	B to 2 P. M. ☿ to 4 P. M. B to 11 P. M. Slightly foggy from 8 to 10 P. M.
25	130.0	...	S, E N E & N	...	82.1	B.
26	129.0	...	N E	...	130.8	B.
27	129.4	...	N by E, N E & N	...	168.9	B.
28	124.0	...	N N E & N E	...	100.5	B. Slightly foggy at 6 & 7 A. M. & from 7 to 9 P. M.
29	128.0	...	N E	...	92.9	B.
30	129.3	...	N E & N W	...	68.4	B. Slightly foggy from 9 to 11 P. M.
31	122.5	...	N W & N E	...	65.8	B Slightly foggy from midnight to 2 A. M. & 9 to 11 P. M.

☿ Cirri,—i Strati, ☿ Cumuli, ☿ Cirro-strati, ☿ Cumulo-strati, ☿ Nimbi,  
☿ Cirro-cumuli, B clear, S strati, O overcast, T thunder, L lightning  
R. rain, D drizzle.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of December 1872.*

MONTHLY RESULTS.

	Inches.
Mean height of the Barometer for the month ... ..	29.977
Max. height of the Barometer occurred at 10 A. M. on the 26th ...	30.186
Min. height of the Barometer occurred at 4 P. M. on the 3rd. ...	29.766
Extreme range of the Barometer during the month ...	0.420
Mean of the daily Max. Pressures ... ..	30.052
Ditto ditto Min. ditto ... ..	29.920
Mean daily range of the Barometer during the month ...	0.132

	°
Mean Dry Bulb Thermometer for the month ... ..	70.0
Max. Temperature occurred at 2 P. M. on the 3rd ... ..	83.7
Min. Temperature occurred at 6 & 7 A. M. on the 31st ... ..	57.4
Extreme range of the Temperature during the month ... ..	26.3
Mean of the daily Max. Temperature ... ..	78.2
Ditto ditto Min. ditto, ... ..	63.4
Mean daily range of the Temperature during the month ...	14.8

Mean Wet Bulb Thermometer for the month ... ..	64.8
Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer ...	5.2
Computed Mean Dew-point for the month ... ..	60.6
Mean Dry Bulb Thermometer above computed mean Dew-point ...	9.4

	Inches.
Mean Elastic force of Vapour for the month ... ..	0.534

	Troy grain.
Mean Weight of Vapour for the month ... ..	5.87
Additional Weight of Vapour required for complete saturation ...	2.13
Mean degree of humidity for the month, complete saturation being unity	0.73

	°
Mean Max. Solar radiation Thermometer for the month ... ..	132.4

	Inches.
Rained 3 days,—Max. fall of rain during 24 hours ... ..	0.06
Total amount of rain during the month ... ..	0.09
Total amount of rain indicated by the Gauge* attached to the anemometer during the month ... ..	0.05
Prevailing direction of the Wind ... .. N. E.	

\* Height 70 feet 10 inches above ground.



## APPENDIX.

*List of Donations (not including Books or other publications and MSS.,  
these being acknowledged in the monthly library lists).*

[Objects marked with an asterisk have been transferred to the Trustees of the  
Indian Museum.]

Donors.	Donations.
Attar Sing, Sirdár Bahádur,	... A silver coin from Udaipur. " coin of 'Aláuddín Muhammad Sháh, of Dihlí.
Bayley, The Hon'ble E. C., C. S. I.	Four Diamonds, said to have been found in the bed of a hill stream near Simla.
Beverley, H., Esq., C. S.	... Knotted ropes used by the Santáls in taking the Census of 1872.
Bowie, Capt. M. M.	.. Copper plate grant in three leaves from Sambhalpúr.
Carleton, Rev. M. M.	... Several Bactrian copper coins.
Eden, the Hon'ble A.,	... A box of copper coins. ... Eight pieces of tin coins from Tenasserim.
Foster, J. M., Esq.,	... Three large and three small Asám silver coins.
Francis, Dr. C. R.	... *A box of petrified seeds.
Gangaprasád, Munshi,	... 6 copper and 4 silver coins found in the Morádabád District.
Haughton, Col. J. C., C. S. I.	... Eleven silver coins of old Bengal kings. " " A brass sleeve link bearing an Arabic inscription.
Hughes, Capt. W. G.	... Facsimile of a copper plate inscription found at Karennee.
L'Académie Hongroise des Mines et Forêts de Schemnitz,	... A Bronze Medal struck in commemoration of the foundation of the Academy in 1770.
Long, Rev. J.	... A framed Lithograph representing the Races of Russia.
Norwegian University, Royal,	... *30 specimens of minerals and shells from Norway.
Pcal, S. E., Esq.	... *A model illustrating the Nágá method of climbing trees, and a celt.
Rajendralála Mitra, Babu,	... Three copper seals with inscriptions, received from Col. Pearse, R. A.
The Surveyor General,	... Two photographs of Lushai Arms and Utensils.
Tonnerre, Dr. C. F.	... *The skin of a Cobra.





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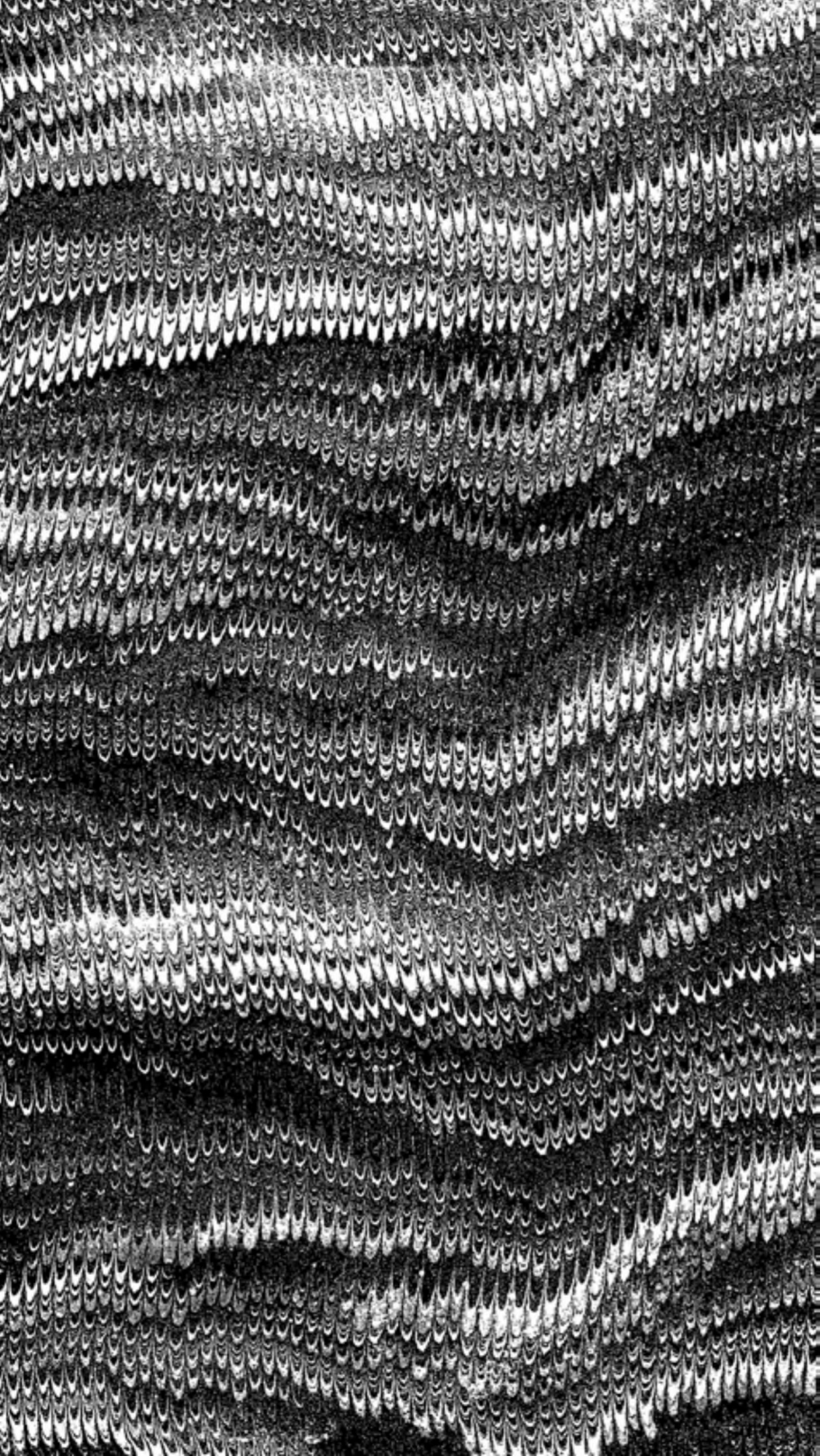
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